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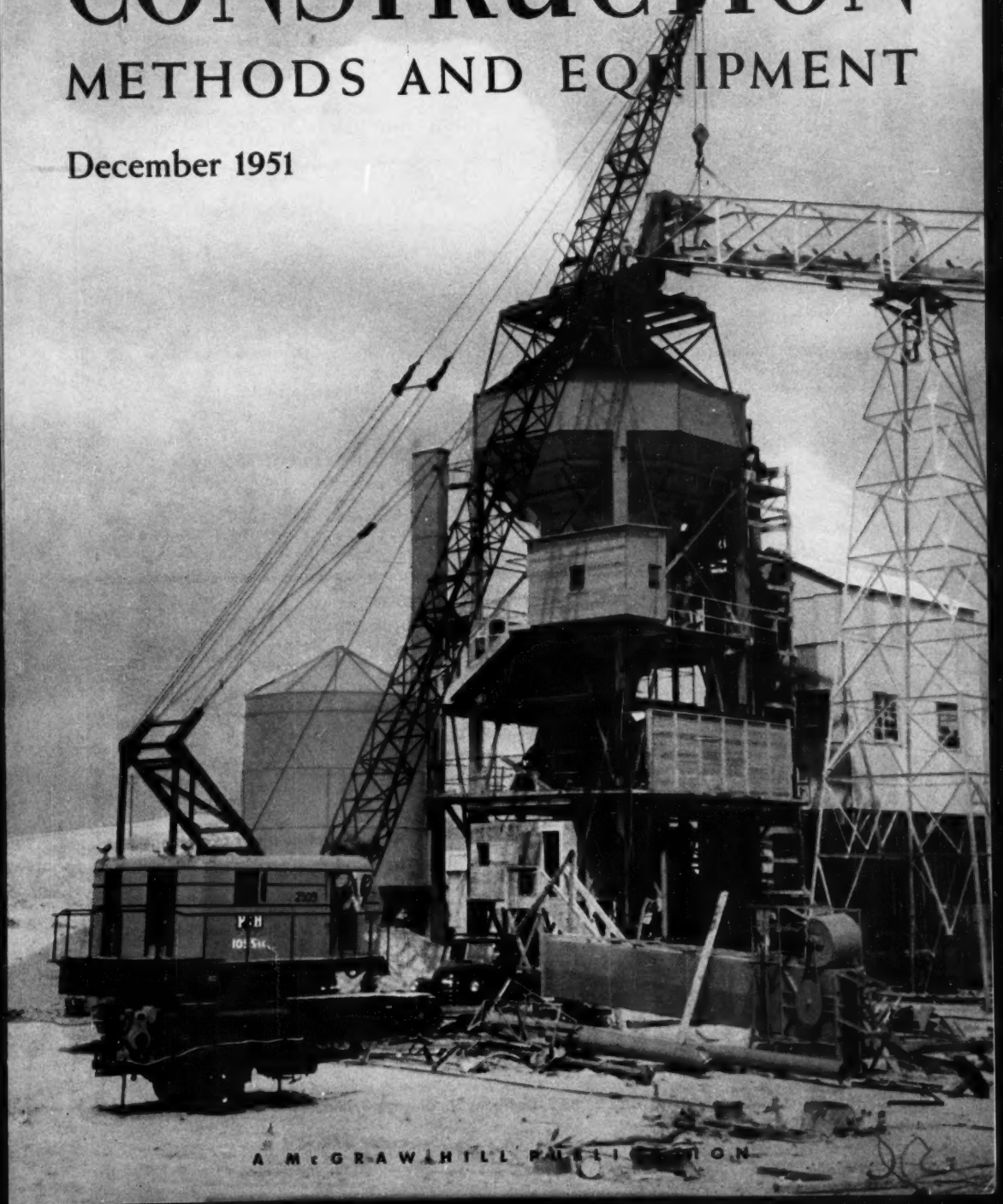
CONSTRUCTION

METHODS AND EQUIPMENT

December 1951



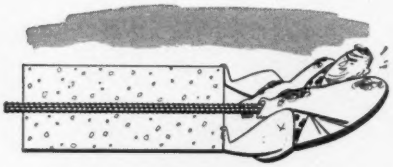
A McGRAW-HILL PUBLICATION

Advantages offered by Inland HI•BOND since 1943 now officially recognized by American Concrete Institute

At the annual convention of the American Concrete Institute in 1949, Committee 208 on Bond Stress proposed changes in design stresses for concrete reinforcing bars. These proposals were made after Bureau of Standards tests proved that certain "improved" reinforcing bars could live up to higher standards.

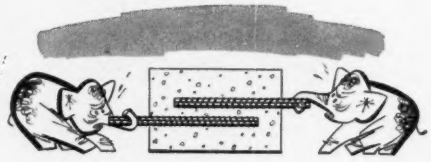
At the 1950 convention, the ACI Building Codes Committee adopted the proposals of Committee 208. And in February 1951, the Institute officially accepted the new building code change.

It is interesting to note that Inland HI-BOND has, for eight years, offered all advantages of higher bonding properties now officially recognized by ACI.



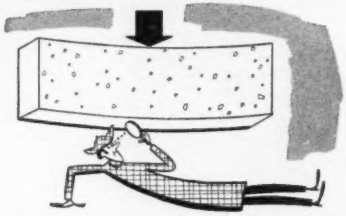
1 Increased bond stresses and greater resistance to slip

See reports on National Bureau of Standards research by Arthur Clark . . . ACI Proceedings, Vol. 43, p. 381; Vol. 44, p. 437; Vol. 46, p. 161; by C. C. Fishburn . . . ACI Proceedings, Vol. 44, p. 289.



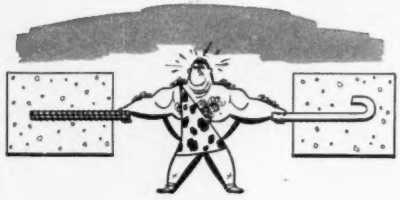
2 Increased efficiency at splices

See reports on National Bureau of Standards research by Ralph W. Kulge and E. C. Tuma . . . ACI Proceedings, Vol. 42, p. 13.



3 Reduced width of tensile cracks

See reports on National Bureau of Standards research by David Watstein and Norman Seese, Jr. . . . ACI Proceedings, Vol. 41, p. 293.



4 Hook anchorages unnecessary in most applications

See reports on National Bureau of Standards research by C. C. Fishburn . . . ACI Proceedings, Vol. 44, p. 289; by F. E. Richart . . . ACI Proceedings, Vol. 45, pp. 97 and 237.

See new ACI Building Code

INLAND **HI-BOND®**

The reinforcing bar with the built-in anchorage

INLAND STEEL COMPANY 38 S. Dearborn St., Chicago 3, Illinois

B.F.Goodrich

Why contractor chooses BFG tires for traction and long wear

TULLY AND DI NAPOLI, INC., of Corona, New York, is one of the largest general contractors in the New York area. They operate a fleet of 4 tractors, 4 low-bed trailers, 38 dump trucks, 9 scrapers, 17 automobiles and 14 station wagons, in addition to their 18 shovels, 16 truck cranes and other construction vehicles. The tires they use on these vehicles get extra punishment from sharp rocks and slag.

Long a user of BFG tires, they are particularly well pleased with the *all-nylon* Rock Logger truck tires. Since the purchase of their first set of 8, they have found that these all-nylon tires have 40% more mileage than similar tires without this nylon construction feature.

B. F. Goodrich tires were chosen by this firm because of their superior ability to withstand severe shocks and to resist cutting. They have this greater bruise resistance because they are built with the patented B. F. Goodrich *nylon shock shield*. Strong, elastic layers of nylon are built in between the tread rubber and the cord body. Under impact, these cords work together . . . absorbing and distributing the shock evenly. This special feature is found in all BFG tires of 8 or more plies at no additional cost. They have greater cut resistance because of special tread compounds.

See your local B. F. Goodrich dealer. Let him show you how you can get better service and lower operating overhead for every kind of off-the-road operation. *The B. F. Goodrich Company, Akron, Ohio.*

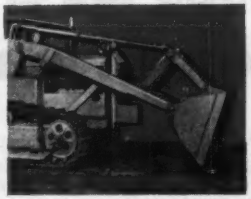
BUCKETFUL of Cost Cutting

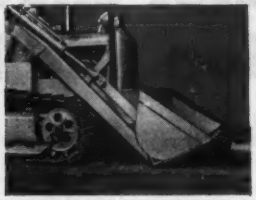
When it comes to cutting loading costs . . . stepping up profits, the Oliver Model "B" Crawler and Ware Loader is "loaded" with *plus* features.

Take the hydraulically controlled bucket, for example. 110° bucket rotation and 28° "tilt back" give you a full bucket every time. "Breaking out" action is 3 times the lifting effort of the loader . . . a particularly important advantage when loading out hard-packed material or for stripping operations. Bucket level is automatically maintained when lifting load, preventing wasteful spillage. You can control speed of discharge . . . fast or slow, easily and gently. And, even with the "tilt back" action, you still have a 32° (from vertical) dump angle . . . a control range no other loader can match. You get bigger loads . . . *faster!*

The Oliver-Ware "B" loader was designed and built exclusively for Oliver Model "B" tractors. Its ideal fit with the tractor eliminates unneeded dead weight and assures maximum stability for the entire unit. The Oliver semi-rigid axle allows limit oscillation of the track, eliminating the possibility of track-frame djstortion. A hydraulic shock absorber smooths out pressure surges . . . prevents damage to loader and tractor parts.

For complete information on how the Oliver-Ware Model "B" tractor loader can cut costs for you, see or write your Oliver Industrial Distributor.



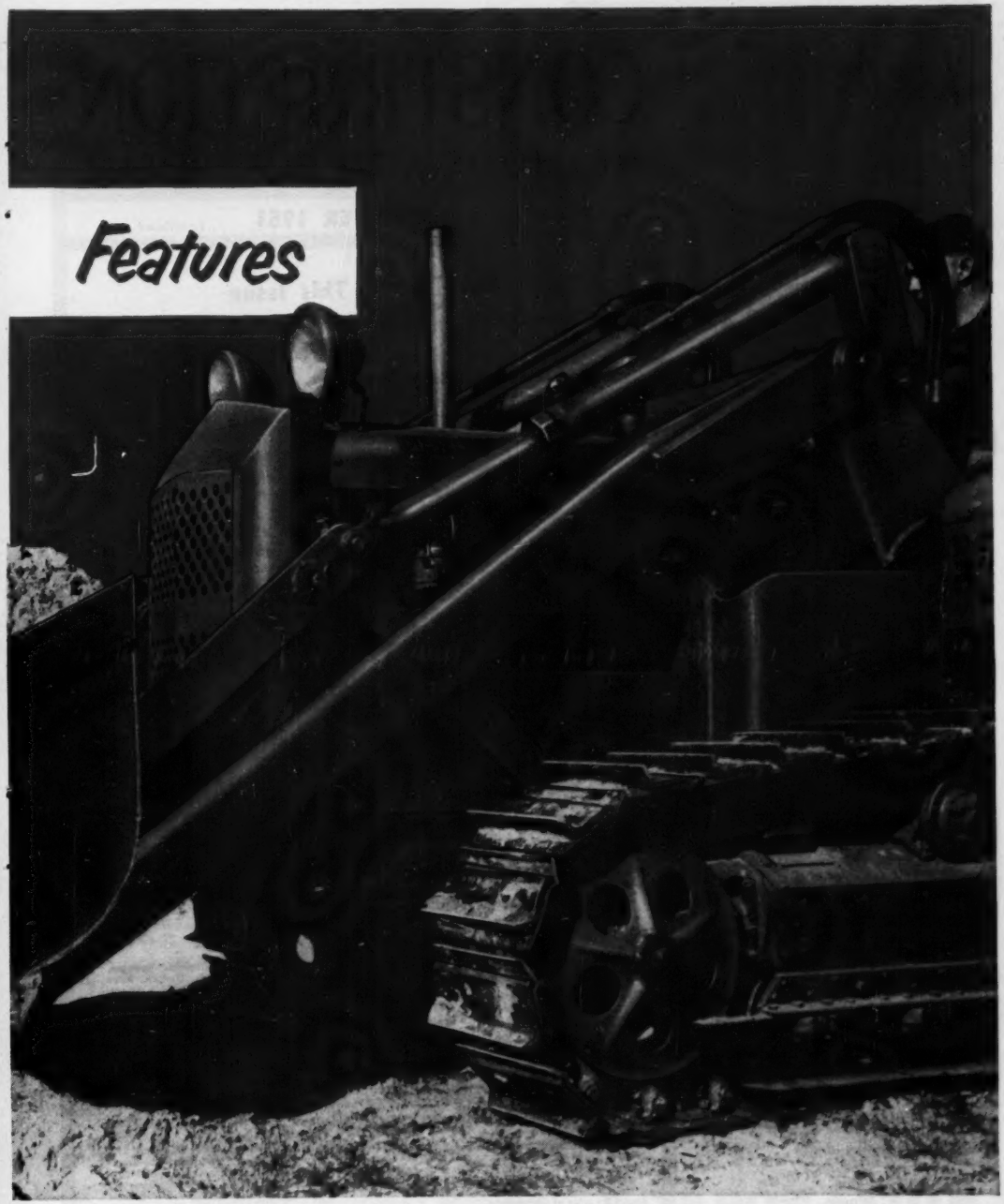


Plenty of power, plus the wide angle of bucket rotation, assures faster, more positive digging. 28° "roll back" assures maximum break-out action for a full bucket every time.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of Industrial Wheel and Crawler Tractors



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Your choice of COLOR

IN HARD BOILED* Safety Hats

STRONGER-THAN-STEEL FIBERGLAS

crowns offer unlimited choice of vivid, permanent colors... with color molded all the way thru the safest crowns ever built. Shock-resisting ribbed design also available in aircraft grade aluminum.

Write for Full Color Circular

SAVE MONEY ...save time! One size fits all heads . . . reduces inventories. Fully adjustable headband and hammock; can be changed in *six seconds*. Self-shaping and air-cushioned for comfort.

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CONSTRUCTION METHODS AND EQUIPMENT

Volume 33, Number 12 **DECEMBER 1951** Established 1919

Pay Dirt in This Issue

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Joined pavers lay a half-mile of 8-in. concrete slab, 24-ft wide, each day; more yardage for construction dollar

Long Bolts Lower 300-ft Pipe to River Bed 46
Threaded rods on 27 pile bents lower 64-in., concrete-encased pipe evenly as workmen turn 6-in. bearing nuts in unison

What Can I Do About Construction Safety? 52
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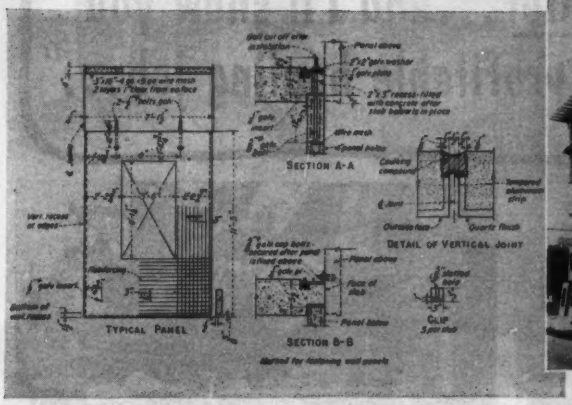
An Idea with a Future!



PANEL CONSTRUCTION OFFERS WIDE RANGE OF POSSIBILITIES

'INCOR' 24-HOUR CEMENT used in precast panels for MIAMI'S FIVE-FIFTY BUILDING

● Panel construction—lightweight aggregate or sandwich wall—is spreading rapidly.

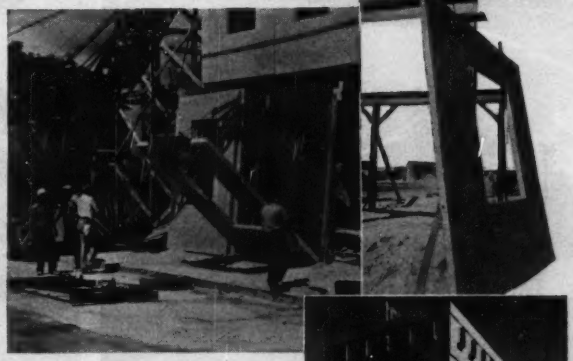
This new building in Miami has story-high, 4-in.-thick, precast wall panels of lightweight concrete, supported from floor above by bolts cast in top edge of slab. Lower edges are secured to edge of floor by angle clips. Vertical joints are closed from the back by spring-aluminum strips snapped into dovetail joints, then caulked from behind. Interior wall back-up is 2" glazed tile.

A reinforced-concrete utility shaft houses the elevators, stairs and service facilities, and carries wind-load stresses, in a structure built to withstand a 175-mph hurricane. Precast panels made spandrel walls unnecessary.

The precision-made wall panels were cast face down with 'Incor' concrete, using pumice aggregate for weight reduction—quartz aggregate and white cement for facing.

Fast, thorough 'Incor'* curing minimizes costly form requirements, assures high strength, early and ultimate . . . at lowest initial and annual cost!

*Reg. U. S. Pat. Off



FIVE-FIFTY OFFICE BUILDING
Brickell Ave. bet. S. E. 5th & S. E. 6th Sts., Miami
Owner: **FIVE-FIFTY INC.**
Architect: **ROBERT LAW WEED & ASSOCIATES**
Structural Engineers: **JORGENSEN & SCHREFFLER**
Contractor: **J. Y. GOOCH CO., INC.**
Precast Panels: **MAULE INDUSTRIES, INC.** all of Miami

LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

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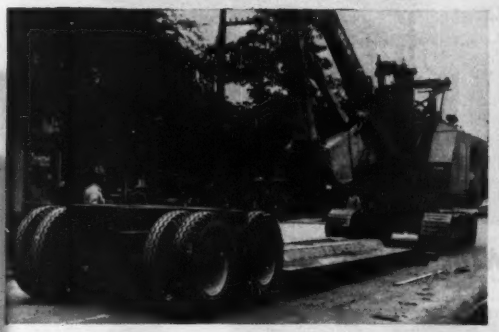
the Man said:

"Give me an easy loading trailer...and I'll show you a profitable hauling job..."



Shown here: Loading an 80-D Northwest the easy Talbert way

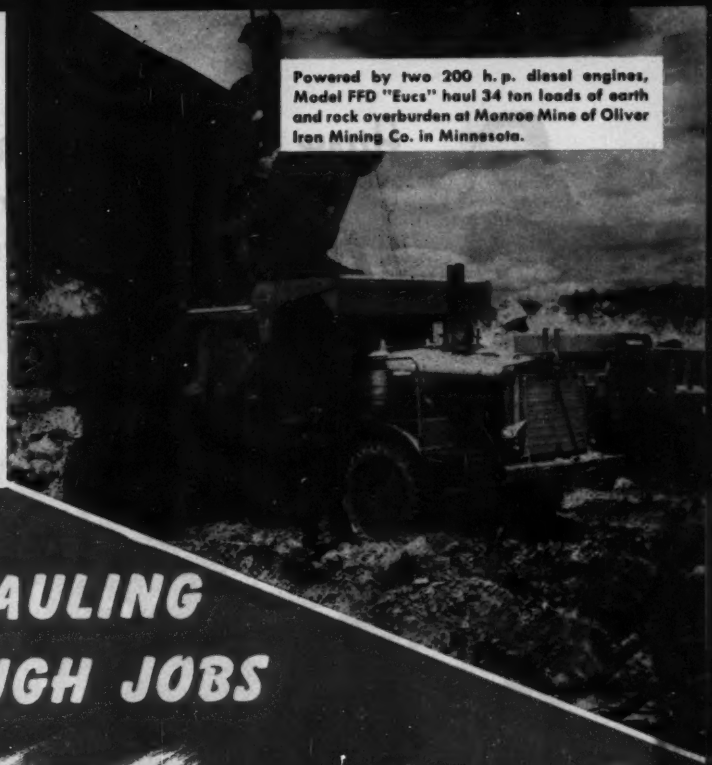
for example: The TALBERT Removable Gooseneck* Trailer

- Front end loading—no rear bridge, short boards, minimum blocking, etc.
- Light-weight Removable Gooseneck*—no moving parts.
- Easy, safe, one-man operation.
- Large "production-priced" tires—interchangeable with tractor tires.
- Spring tandem suspension—for high road speeds.
- Minimum empty weight—maximum payload.

THE TALBERT CONSTRUCTION EQUIPMENT CO., of Lyons, Illinois manufactures a complete line of low-bed trailers and dump semi-trailers

THE TALBERT-WAY IS THE EASY WAY

"EUCS" for



Powered by two 200 h.p. diesel engines, Model FFD "Eucs" haul 34 ton loads of earth and rock overburden at Monroe Mine of Oliver Iron Mining Co. in Minnesota.

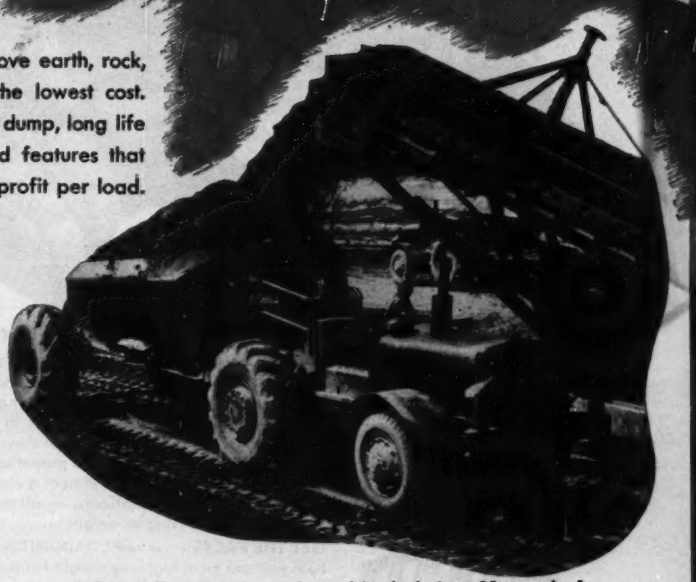
LOW COST HAULING ON TOUGH JOBS

Euclids are designed and built to move earth, rock, coal, ore and heavy excavation at the lowest cost. Large capacity, speed on the haul and dump, long life in heavy duty service, these are Euclid features that assure more loads per hour and more profit per load.

They haul big loads! Bottom-Dump Euclids have capacities of 13 to 25 cu. yds., Rear-Dump "Eucs" from 10 to 34 tons.

"Eucs" are fast! Top loaded speed of the Bottom-Dump is 34.4 m.p.h. Rear Dumps travel up to 36.3 m.p.h. with full payloads. They're powered by diesel engines from 125 to 400 h.p.

Whether you have a tough off-the-highway hauling job, or one where conditions are good, Euclids are your best bet for low cost hauling and long, dependable service.



A Bottom-Dump receives a heaped load of about 18 cu. yds. from a Euclid Loader during construction of an access road to a Hydrogen Bomb Plant site in South Carolina. Contractor: R. B. Potashnick.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

CABLE ADDRESS: YUKLID — CODE: BENTLEY

EUCLIDS *Move the Earth*

Have You Load Limit Problems?

Solve Them with SMITH *LOADLIMIT* Truck Mixers

Are your present concrete prices based on bigger payloads than today's highway laws permit? If they are, you may find the answer to your problems in Smith LOADLIMIT Mixers.

Smith 6½ cu. yd. LOADLIMIT Transit Mixer discharging into a concrete bucket. Note all discharge operations are performed by driver while he is standing on the ground. No need for climbing up on machine.

LIGHTEST WEIGHT in a Really RUGGED Mixer!

Smith LOADLIMIT models were designed to lick your weight problem, but without any sacrifice in sturdy working parts. They have the same trouble-proof transmission, the same Manten steel drum, the same bevel gear drum drive and the same oil type clutches that have made Smith the first choice in truck mixers all over the United States. You save a lot of weight through Smith's exclusive design. The patented feed chute . . . patented charging cone . . . and patented T-shaped blades make it possible for you to operate a Smith LOADLIMIT without a closing door. And by removing chute lifter, sign panels and operator's platforms — *all parts unnecessary to mixer operation* — there is an additional saving in weight.

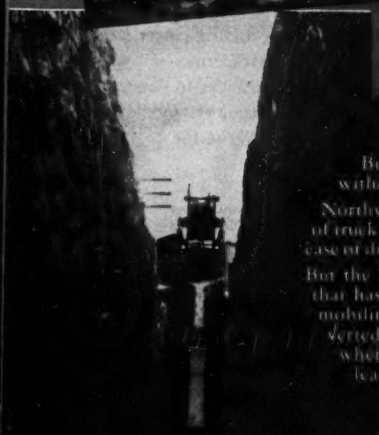
GET THE FACTS — A new LOADLIMIT Bulletin No. 251 is just off the press. It tells you how you can meet highway weight limits with Smith LOADLIMIT models. Write for copy.

THE T. L. SMITH COMPANY, 2851 North 32nd St., Milwaukee 45, Wis., U. S. A.

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH



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But, that was before they saw it work! For the first time a trench could be dug without going into the cost of a one-purpose machine.

Northwest Pullshovels brought depths to over 20 feet, straight-wall trenches, new ease of truck loading, ability to work in the confined conditions of streets and alleys, and a new ease of digging basements without the delays and costs of putting the machine in the hole.

But the Northwest Pullshovel brought more than that. It brought mechanical design that has never been equalled—design that meant maximum operating ranges, better mobility and increased output. And, add to that the fact that the buyer easily converted to a Shovel, Crane or Dragline for other classes of work and had a unit that whether operating as a Pullshovel, Crane, Shovel or Dragline was recognized as a leader for speed, low-cost upkeep and output.

We won't be far wrong when we tell you there are more Northwest Pullshovels in service than all other makes put together. Don't overlook its possibilities.

NORTHWEST ENGINEERING COMPANY
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NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

McKIERNAN-TERRY PILE HAMMERS

Help Beat Schedule on sewer project

Eight months ahead of schedule! That was the record chalked up on this Oakland outfall sewer line, despite wet heaving ground that required sheeting of trench every inch of the way. An ingenious mobile sheeting jig and fast-driving McKiernan-Terry Pile Hammers solved the problem.

Here's how. The jig held lagging for 20 lin ft of timber sheeting on both sides of the trench at the same time. Sheeting was driven quickly by McKiernan-Terry No. 6.5 Double-Acting Hammers . . . as much as 245 pieces of sheeting daily.

Wherever you need speed and pile-driving power, it will pay you to use dependable McKiernan-Terry equipment. Wide-range line includes 16 sizes of single-acting and double-acting hammers and 2 sizes of double-acting extractors. Write for bulletin.

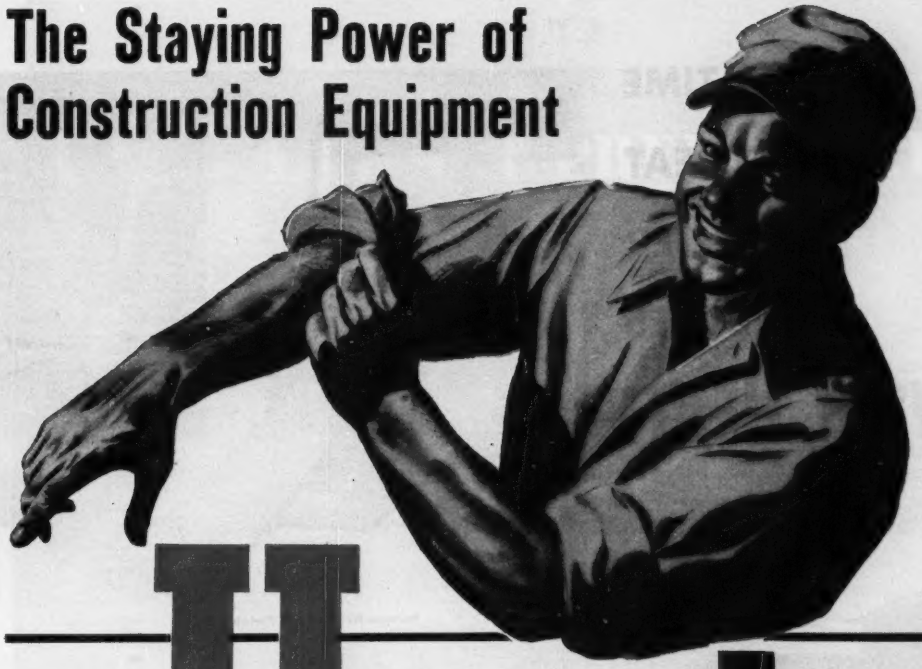
McKiernan-Terry Pile Hammer punches down timber sheeting for fast sewer job in Oakland, Calif. Ben C. Gerwick Inc. and George C. Pollock Co. were the joint contractors.

McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS
14 PARK ROW, NEW YORK 38, N. Y.
Plants: Harrison, N. J., and Dover, N. J.

MK-908

The Staying Power of Construction Equipment



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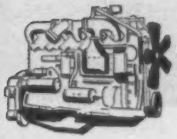


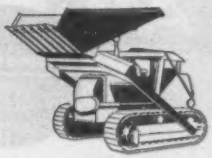
BY THESE 4 STEPS

1st step: Examine Cities Service lubricants for out-and-out quality through your purchasing experts or test facilities...or from service records established by critical users.

2nd step: Look into the completeness of the Cities Service line as an aid to simplified ordering and prompt, steady supply . . . backed by the extensive facilities and intensive cooperation to keep you out of any lubrication "jam."

3rd step: Review the construction field's most effective lubrication practices by consulting that fully informed specialist, the Cities Service Lubrication Engineer.

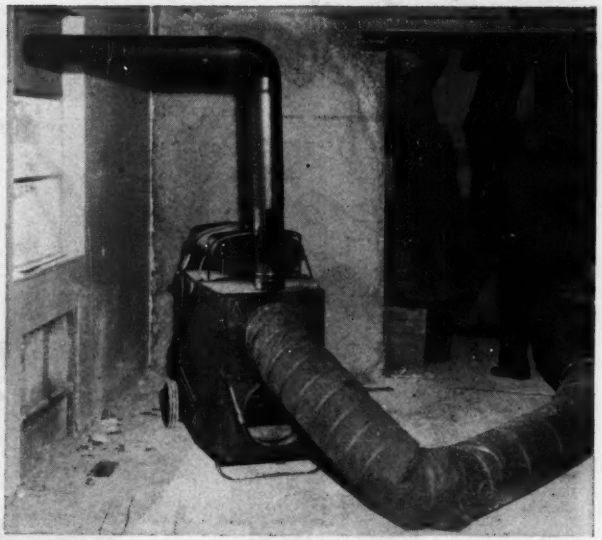
4th step: Ask for facts about the high character of the Cities Service line and the practical technical assistance now upping the staying power of construction equipment for many of industry's "hardest drivers." Write CITIES SERVICE OIL COMPANY, Rm. 253, Sixty Wall Tower, New York City 5. Or call the Cities Service office nearest you.



CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

STILL TIME TO BEAT WINTER SCHEDULES WITH HEAT!

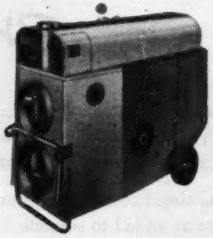


Herman Nelson SAFE Portable Heaters

●Dependable, *portable heat* puts new life in winter construction schedules. Engineered for rugged, heavy duty service, Herman Nelson *safe* portable heaters deliver heat . . where you want it . . . when you need it. Greater heat producing capacity—up to 450,000 BTU/hr—also greater versatility and efficiency saves the original equipment cost again and again. They're safe, too! Exclusive "sealed flame" and forced air ventilation features of Herman Nelson units eliminate carbon monoxide fumes, and fire hazards. With Herman Nelson units on the job, there's still time to beat your construction schedules . . . regardless of weather.

Today's Best Buy is Better Air!

For heat that is quick, clean, *safe* and economical—let us show you why smart construction people buy Herman Nelson Portable Heaters as a money-making investment. Complete line of models and range of capacities. For full information write to Dept. CM-12.



HERMAN NELSON DE LUXE I

Capacity 280,000-450,000 BTU/hr. Completely automatic, including temperature control. Fresh air delivery 2,000-2,350 cfm. Electric motor powered.

AAF herman nelson moline illinois

HERMAN NELSON

Division of **AMERICAN AIR FILTER COMPANY, INC.**

MOLINE, ILLINOIS

Hazard

LAY-SET PREFORMED

—a distinctive BRAND

Recent excavations in Egypt revealed bricks bearing names believed to be those of the makers. Stones in the walls of Pompeii bore the proud marks of Italian stone cutters. During the Middle Ages the workman placed a distinctive mark on his artistic creations. Thus grew the practice of branding merchandise. Making wire rope which can bear the proud LAY-SET trade mark is traditional with HAZARD. Since the day in 1846 when Erskine Hazard built the first machine which laid a group of wires around a core to make a better wire rope, the HAZARD brand on a reel has been evidence of highest quality. It is your assurance that the wire rope will perform to your satisfaction.

See your local HAZARD distributor

ACCO *In Business for Your Safety*

ALSO MAKERS OF THE COMPLETE LINE OF Registered WIRE ROPE SLINGS

AMERICAN CHAIN & CABLE

HAZARD WIRE ROPE DIVISION*

TRADE MARK

Wilkes-Barre, Pa. • Chicago • Denver • Houston • Los Angeles • New York • Odessa, Tex. • Philadelphia • Pittsburgh • San Francisco • Bridgeport, Conn.

BAY CITY - the biggest value in ¾ yard machines .... easily convertible

Quick convertibility without machinery change is a feature that gives you more for your equipment dollar when you buy BAY CITY. Then too, you get ruggedness, dependability and long life that can't be matched.

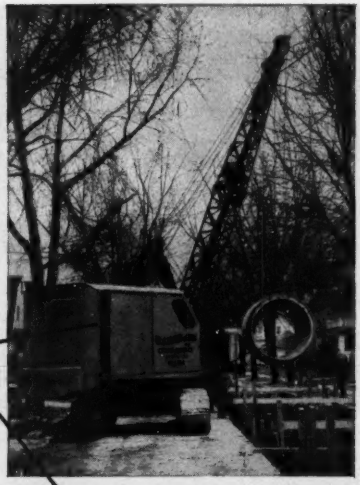
Well balanced for Crane Work.

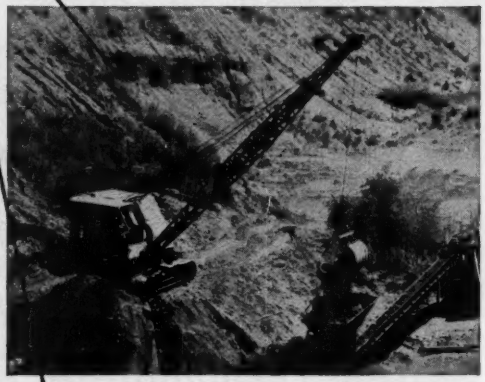
Stability for low boom operations.

Easy operation for hard digging.

High line speeds for faster material handling.

Power for fast digging cycle.





BAY CITY

BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

no meat except chicken, other eats pork and chi but no beef—beef being

the lure now is the chance being in on the kill—that nig when some youngster will kno

the Bomber into retirement for keeps.

Up New England way they think the time has come. Spill-

punt just so the passer will have a chance to get the ball away without being chased

POWER BUGGIES SPEED WORK ON WORLD'S LARGEST UNDERGROUND GARAGE

WHITEMAN BUGGIES PLACING 50,000 CU. YD. OF CONCRETE FASTER—AT FAR LESS COST!

Pershing Sq.

Pour First Concrete for Garage

Pershing Square underground gar today, pouring for the struc- roof. It will take 5000

Trees and grass will soon grow again in Los Angeles' Pershing Square...but underneath will be parking space for 2000 cars at one time. Concrete for this 630,000 square foot garage is speeded to all parts of the job by Whiteman Power Buggies... over narrow runways, up 25% grades... then placed quickly with Whiteman's positive control "in-gear" dumping mechanism. One Power Buggy does the work of 6 men with wheelbarrows and does it faster. Carries 12 cu. ft., yet is light weight. 7.5 hp aircooled engine. Speeds up to 16 mph. Rugged, dependable. Priced to pay for itself in a short time. Send coupon for details *now!*

WHAT THE CONTRACTORS SAY:

C. A. McMahon, superintendent of construction for Ford J. Twaits Co., Morrison-Knudsen Co., Inc. and T-S Construction Engineers, Inc. on City Park Garage, says: "Our Whiteman Power Buggies are doing a tremendous job. It amazes me how they speed along the runways, turn on a dime and squeeze through tight spots all day long, yet never get tired. They're cutting costs and speeding up the job in a big way."

Whiteman

CONCRETE EQUIPMENT

WHITEMAN MFG. CO., Dept. C.
3249 Casitas Ave., Los Angeles 39, Calif.
Please send name of distributor, literature and prices on Whiteman Power Buggies.

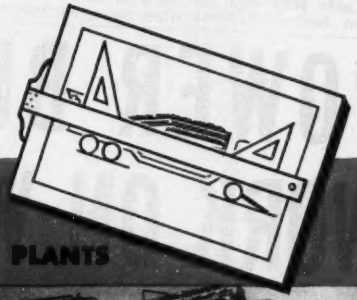
Name_____

Firm_____

Address_____

City_____ Zone____ State____

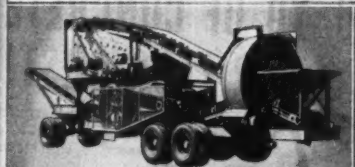
FOR THE *RIGHT* COMBINATIONS



MEET YOUR AGGREGATE REQUIREMENTS WITH **UNIVERSAL** PORTABLE PLANTS

293Q TWINDUAL PACEMAKER ROCK & GRAVEL PLANT

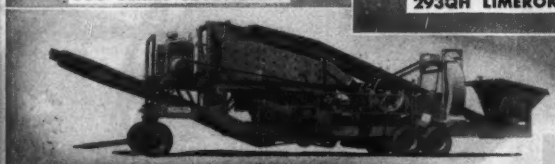
880 GRAVELMASTER



800 SERIES SECONDARY

293QH LIMEROK

CSE TRAVELER GRAVEL PLANT

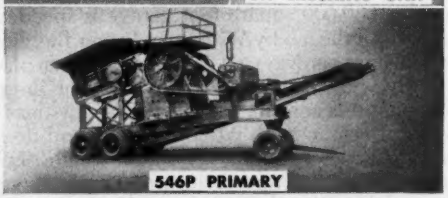


TDM-24 TWINDUAL MASTER GRAVEL PLANT

PORTABLE CONVEYOR

PORTABLE WASHING PLANT

GA CRUSHING UNIT



546P PRIMARY

There is always one right combination for every crushing job . . . one that will do your job better and faster. Select the right equipment from the complete line of Universal portable plants . . . the most complete line of rock, gravel and aglime crushing, screening, loading and washing equipment available.

You get balanced production, high capacity, low cost operation, minimum maintenance with field-proven Universal portable plants . . . Whether your job requirements are big, medium, or small, Universal builds the plant you need for most profitable operation. Ask your Universal distributor or write for illustrated literature.

UNIVERSAL ENGINEERING CORPORATION Division of PETTIBONE MULLIKEN CORPORATION

327 8th St., N.W., Cedar Rapids, Iowa
Phone 7105

4700 West Division St., Chicago 51, Illinois
Phone Spaulding 2-9300

How to get MORE WORK from your "Cat" Motor Grader!

HERE'S the situation in a nutshell. The speed, versatility and big work capacity that have made "Caterpillar" Motor Graders an essential construction tool have also made them necessary to the defense effort. As military orders must be filled first, you may not be able to obtain prompt delivery of new machines. So it will pay you to plan *now* to get greater production and longer wear from your present equipment.

"Cat" Motor Graders are ruggedly built for long life. But good care on your part can lengthen that life span by thousands of extra service hours. Here's how:

1. Follow the recommended *operating* care in your Operator's Instruction Book. Read and reread it.
2. Observe the *maintenance* suggestions in the Operator's Instruction Book. They're down-to-earth — experience has proved them practical and effective.
3. Anticipate your future replacement parts needs by seeing your "Caterpillar" dealer about them *now*. Don't wait until wear gets beyond repair — many a part can be rebuilt *if* serviced in time.

You're in good hands when you work closely with your "Caterpillar" dealer. He is anxious to help you solve your problems. He has the skilled mechanics and service facilities to help you lick them and keep your equipment in shape.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

Fast worker—reliable, too! This "Caterpillar" Diesel No. 12 Motor Grader is one of thousands that help construction men meet their contracts on schedule. An essential earthmoving tool, it stands up under tough going — handles easily. As a military tool, it's essential for airport construction and maintenance, road construction, the establishment of bases and scores of other jobs.

You're the Doctor Preventive maintenance is good medicine for long life. Your Operator's Instruction Book is invaluable in the fight to conserve machine life. Follow the operation, lubrication and maintenance recommendations. When wear is evidenced in cutting edges, gears, tires or engine, see your "Caterpillar" dealer. He can help you prolong the life of your motor grader. Your motor grader is essential—don't abuse it!

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS

EARTHMOVING EQUIPMENT

EFFICIENCY UP...

Photo Courtesy Schramm, Inc.

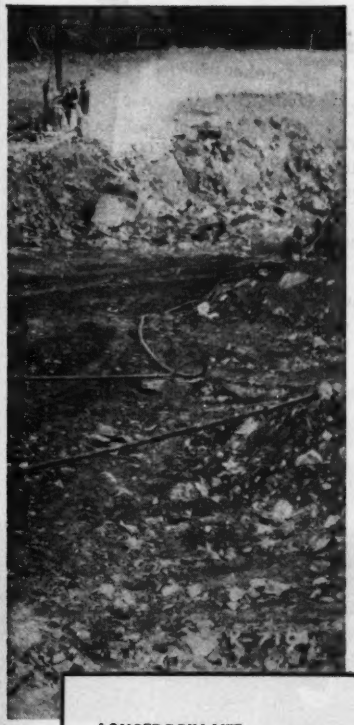
COSTS DOWN...

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

TEXACO

TEXACO

. . . when you use Texaco air compressor oil



LONGER DRILL LIFE, more footage drilled, lower costs — count on these benefits when you use *Texaco Rock-Drill Lubricant EP.* This series of "extreme pressure" lubricants give full protection against wear, guard against rust whether drills are running or idle.

EFFICIENT, economical air compressor operation requires an oil that is *exactly right* for your particular operating conditions. To meet this requirement you have only to use the recommended Texaco air compressor oil. A Texaco Lubrication Engineer will gladly help you.

- Under normal conditions, a Texaco *straight mineral* air compressor oil will assure clean operation, minimum wear, lower maintenance costs.
- Under conditions causing rust in cylinders, coolers, lines and receivers, a Texaco *rust-inhibited* air compressor oil will keep compressors and systems rust-free whether running or not.
- Where service conditions are extremely severe, a Texaco *heavy-duty* air compressor oil will prevent harmful formations of carbon and sludge.
- To combat excessive wear under "wet cylinder" conditions, a Texaco *compounded* air compressor oil will keep wear at a minimum.

Call in a Texaco Lubrication Engineer. Let him tell you about the Texaco Simplified Lubrication Plan that will let you handle *all* your major lubrication with *only six* Texaco lubricants. A time-saving, cost-saving setup. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N.Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

ASKS NO FAVORS...FEARS NO LOADS

QUAKER BELTING

FOR MORE PRODUCTION . . . GET THIS BOOK

. . . and the entire QUAKER Conservation Maintenance Plan — includes maintenance memos, wall chart, factual data to help you reduce maintenance. No charge . . . no obligation.

Stands Weather . . . Wear . . . Extreme Flexing on Any Job

On highway projects . . . or construction operations, Quaker Belts take the roughest treatment . . . give the longest wear.

Quaker Elevating Grader Belting is fabricated from prime, selected duck with friction covers of specially compounded rubber. Flexes freely over the smallest pulleys. Pre-tested quality construction resists bolt tear-outs and ply separation at splice. This service-proved belt gives long wear and top performance on the toughest construction jobs.

For positive on-the-job service with maximum production specify Quaker Rubber Products. For data on the complete Quaker Line of products for the Construction Industry, write for catalog 39-A.

QUAKER RUBBER CORPORATION
DIVISION OF H. K. PORTER COMPANY, INC.
PHILADELPHIA 24, PENNA. BRANCHES IN PRINCIPAL CITIES

MERRY CHRISTMAS!
Cumberland Cements

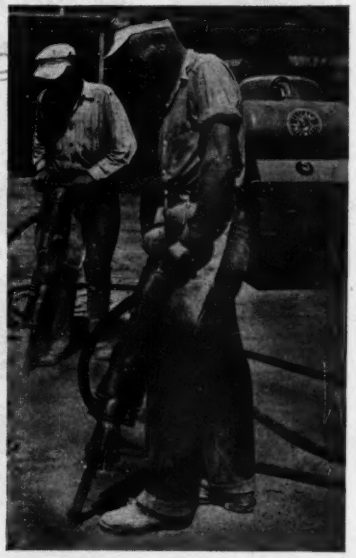
Economical one-man operation and low air consumption are secured when the CP-219 PNEUMATIC CONCRETE VIBRATOR is used for concrete 3" slump and over, and for walls and columns under 15" thick.

With a choice of seven different models of CP Pneumatic and Electric Vibrators, just the right vibrator can be selected for any specific job.

MEETS DEMANDS OF TOUGHEST JOBS

For especially heavy tamping the easy-to-handle No. 4 Ring Valve BACKFILL TAMPER is recommended. Other models available for heavy or average work.

In the world's largest line of DEMOLITION EQUIPMENT there is a CP tool for every type of demolition work. Five models range from the lightweight CP-111 (25 lb. class) to the heavy-duty CP-117 (80 lb. class).



CP PORTABLE COMPRESSORS incorporate four outstanding advantages: dependability, minimum operating cost, low maintenance, long service life. Gasoline and Diesel driven models are available from 60 to 600 cfm.

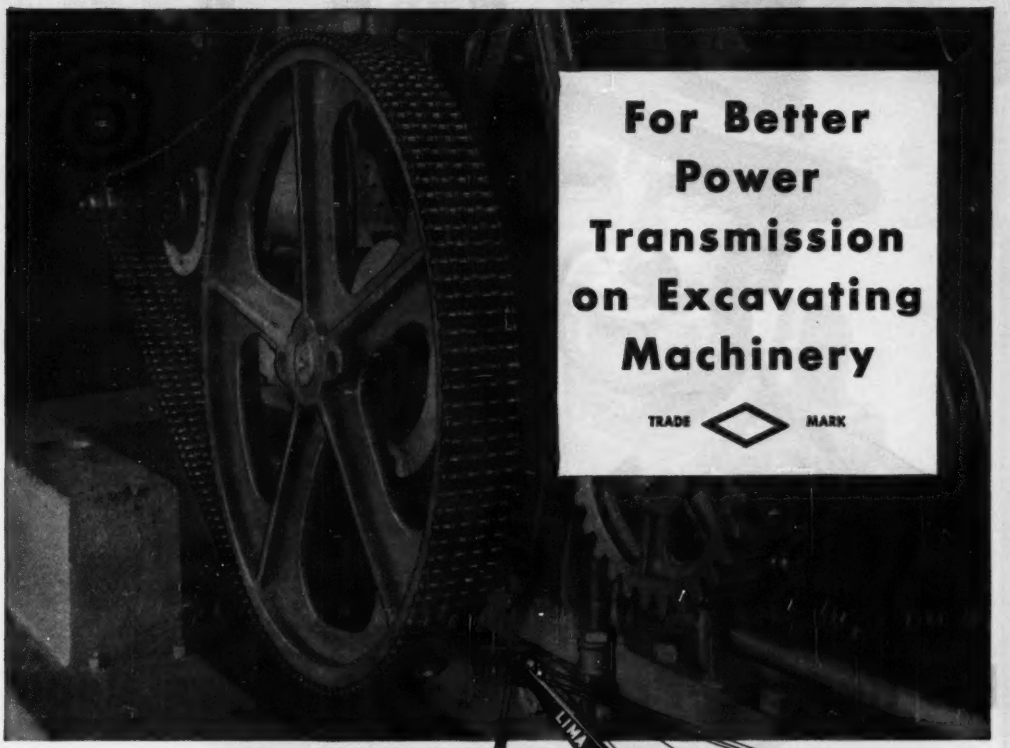
Write for detailed information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

DIAMOND ROLLER CHAINS

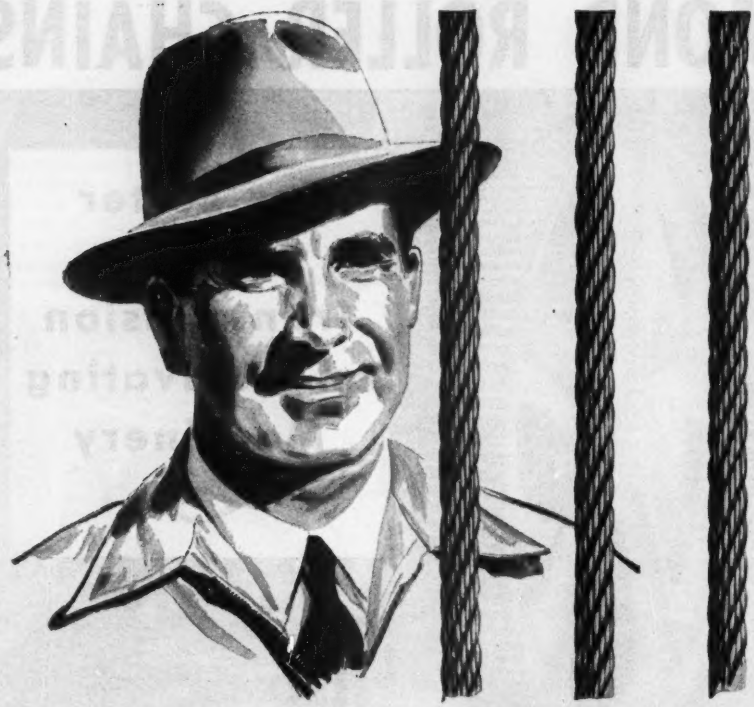


Diamond Roller Chain delivers all the engine power on this Lima Type 34 Shovel.

● Leading machinery manufacturers and contractors have long recognized the wisdom of choosing the best components for original equipment as well as for replacements.

The high reputation of Diamond Roller Chains has been founded on over a half century of superior service. Their matchless uniformity of construction, greater reserve strength, and economy in service is your guarantee of real money- and trouble-saving performance on the job.

DIAMOND CHAIN COMPANY, Inc.
Dept. 418, 402 Kentucky Avenue, Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities
Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



His Records Prove It's Good Wire Rope

This man knows that his Bethlehem rope is giving him a good return on every dollar it cost him.

He isn't just guessing. He keeps records on the doings of all his wire ropes; figures that tell him the date they go to work, how much they accomplish, and when they're replaced. From his figures he can see which brand is *doing the most* for him over a period of time. He doesn't rely on general impressions or rough estimates. He *knows!*

Bethlehem urges that all users of wire rope do likewise—keep records of wire rope performance, expressed in units of work. How many ton-miles a rope accounts for; how many yards of rock it moves, how many cars of coal it hauls up a slope, etc. By doing so, the user can compare one brand against another; see for himself which brand is costing him the *least* for the actual work it does.

We know that in any such comparisons, Bethlehem wire rope will prove an outstanding value. Stack it against the field; keep your own figures. They'll tell you, in black and white, that a dollar invested in Bethlehem rope buys a mighty big dollar's worth of service.

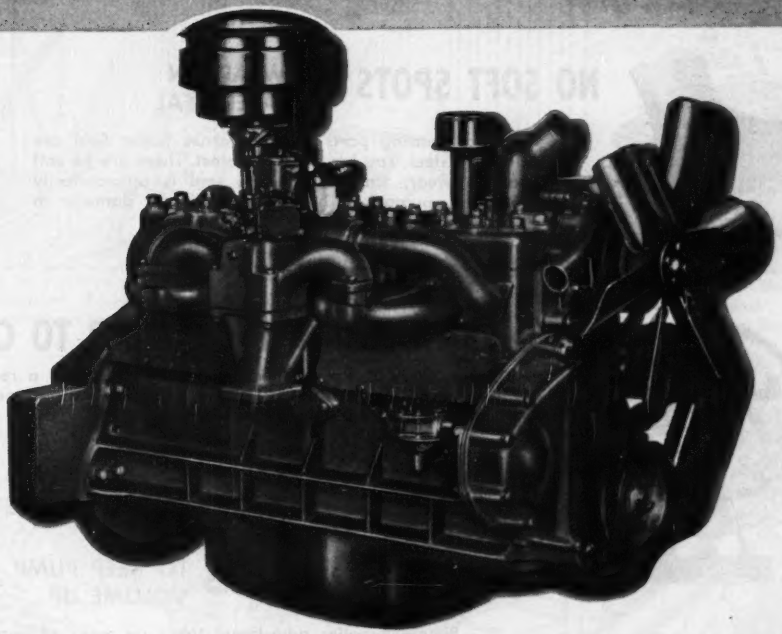
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

LET YOUR RECORDS TELL YOU!

LET'S FACE FACTS

about Industrial Engines



CHRYSLER HAS LOWER FIRST COST

Chrysler quantity production methods have been adapted to specialized industrial engine building. As a result, you get a custom-built engine at mass-production price levels. A Chrysler engine *costs less than many other engines*, yet it's still a special engine *designed* and *engineered* for a special job.

CHRYSLER HAS LOWER MAINTENANCE COSTS

Simplified, clean construction makes *field repair easier, faster, less expensive.* Famous Chrysler engineering achievements like Superfinished Wear Surfaces, dynamically balanced shafts and Chrysler-developed steels and alloys produce parts less subject to wear *—more hours of uninterrupted service.*

CHRYSLER HAS SMOOTHER OPERATION

Because Chrysler Industrial Engines are high speed, high compression engines, they offer *smooth running power under extreme loads.* Scientifically designed combustion chambers extract the maximum power from fuels. No stalling. No bucking. No killing the engine. *Full power range is instantly available.*

CHRYSLER HAS PARTS AND SERVICE AVAILABILITY

Chrysler will keep you operating with a minimum of downtime. *Chrysler Parts and Service are always available!* Again quantity production and standardization keeps strategically located depots and Chrysler Industrial Engine Dealers supplied with complete stocks of parts for immediate delivery.

See your local Chrysler Industrial Engine Dealer, or write:
Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

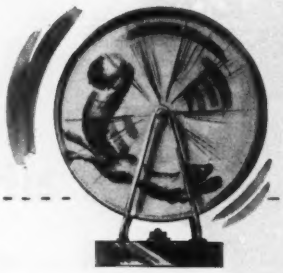
CHRYSLER
Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE

Side-Step Trouble with these three "NO'S" in BARNES "33,000 for 1" PUMPS

NO SOFT SPOTS TO WEAR ON WATER SEAL

The two wearing parts on the Barnes Super Seal are hardened steel. You have steel on steel. There are no soft spots to wear. Since the grease seal is automatically lubricated, pump can be run dry without damage to either pump or seal.

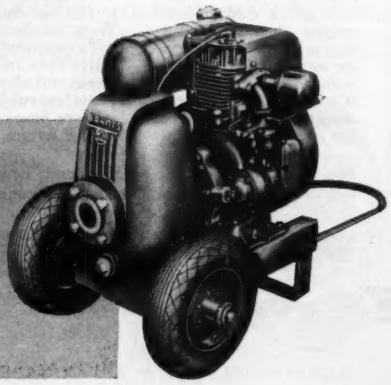


NO RE-CIRCULATING CHAMBER TO CLOG

Barnes "33,000 for 1" Pumps do not have either a re-circulating chamber or port. Cement-water, stones, twigs, leaves and such will not clog the pump.

NO COSTLY REPAIRS TO KEEP PUMP VOLUME UP

Simple impeller adjustment takes up wear of impeller. It is simple and inexpensive to restore pump to its original capacity and performance of high vacuum readings of 25" of mercury and 27 to 28 foot-lift of water.



FOUNDED 1893

Barnes

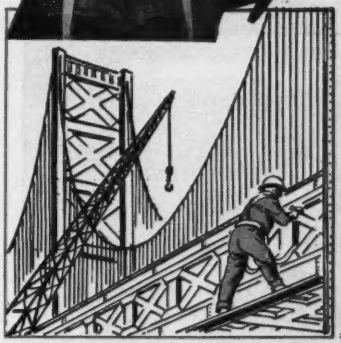
MANUFACTURING CO.
MANSFIELD, OHIO

Complete Line From 4,000 to 90,000 G.P.H. Choice of Electric, Diesel, Gasoline, or Pulley Drive.

BUY THE BEST • • • BUY BARNES

"Here's Two Reasons Why I'm Still Alive and Kicking"

Says Frank Kramer, Bridgeman, U.S. Steel's American Bridge Company



I was working on a bridge job in Ohio, when this happened. Except for two reasons, that would have been my last job.

A drift pin dropped from 60 feet above picked my head for a target. It was coming like a bullet. Somebody yelled, but there was no time to duck.

That pin struck my Skullgard. It would have bashed my skull . . . but Skullgards are tougher. The pin bounced off.

Bad luck wasn't through with me . . . that pin struck an I-beam, bounced back, and hit me full in the face. It felt something like getting kicked by a horse.

It knocked me right off the bridge beam. The undertaker was reaching for me again, but I fooled him a second time. Had my safety belt on.

The boys grabbed the safety line and hauled me up. I had a bloody nose . . . that's all. Skullgards and Safety Belts have got my vote for man's best friend ever since.

This true story—from the many in the files of American Bridge—explains why the company invests thousands of dollars annually in safety hats and belts alone. The equipment is bought for *protection*—but it pays extra dividends in production, through the added confidence that it gives to every worker.

American Bridge management says, "We are sold on safety hats . . . and so are our workmen. There is no law that compels them to wear Skullgards, but most men would no more think of going on the job without helmets than of working in their bare feet. Once a man has seen how a helmet can save a life or prevent serious injury, he doesn't need urging to wear one."

M.S.A. Skullgards are safety-engineered for maximum protection . . . carefully designed for maximum wearing comfort. Choice of several types of linings, that can be easily removed, replaced, and adjusted for any head size. For complete details, ask for Bulletin DK-15.

MINE SAFETY APPLIANCES CO.

BRADDOCK, THOMAS and MEADE STS., PITTSBURGH 8, PA.

At Your Service

54 BRANCH OFFICES IN THE UNITED STATES AND CANADA

Call the M.S.A. man on your every safety problem . . . his job is to help you.

MSA

SAFETY EQUIPMENT HEADQUARTERS

DAVEY

sets new standards of compressor operating efficiency!

Davey Model 315 (Diesel)

● Compressed air is playing an increasingly important role in modern military operations.

The Davey Compressor Co. is currently working on sizeable defense orders and considers it a great honor to be privileged to furnish equipment to our Armed Forces.

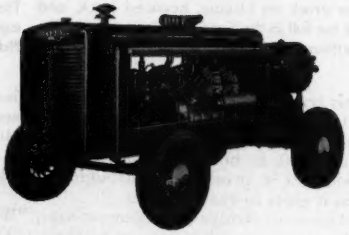
Every Davey Compressor is equipped with *Permanent Peak Efficiency* lifetime valves. These never carbon or foul...do not require cleaning or replacement ...keep operating tools functioning at full capacity.

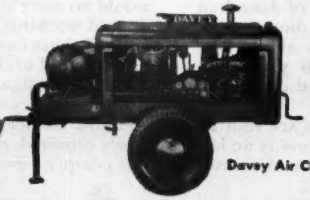
A-4188

There's a Davey for every compressor need!

Davey Auto-Air Model 105

Davey Air Chief Model 210



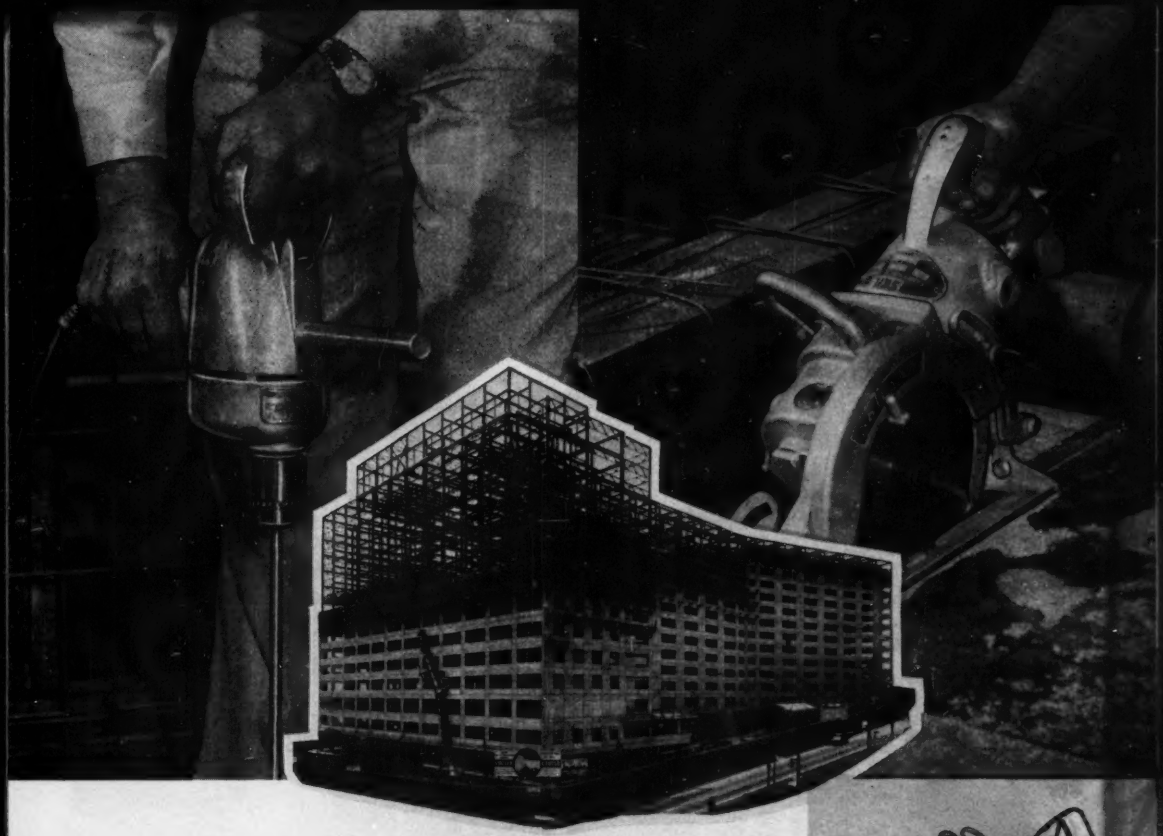


Davey Air Chief—Model 105

DAVEY

DAVEY COMPRESSOR CO.

KENT, OHIO



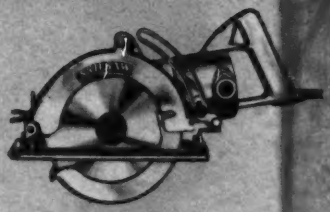
"We're Using 95 SKIL Saws and Drills on $21,000,000 Statler Job!"

says **J. L. MORRIS**, General Superintendent

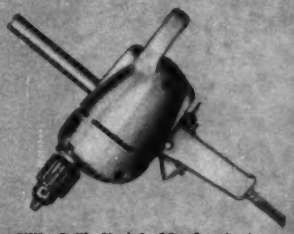
ROBERT E. McKEE GENERAL CONTRACTOR, INC., Los Angeles, California

"This new Statler Center is the biggest hotel since the Waldorf," says Mr. Morris, "a $21,000,000 project. Naturally, with a tight production schedule, we're using only tools we can depend on. And that means SKIL Saws and Drills." Mr. Morris explains, "We're giving 95 SKIL Tools real punishment, and they give back top performance. We're using 65 SKIL Saws, Model 77 and Model 825. And," he adds, "We've got 30 SKIL Drills in four different models going all the time. We give unqualified approval and praise for this equipment and SKIL service."

See your distributor for complete information or call your nearest SKILSAW factory branch



SKIL Saw Model 825—Powerful 8¼" saw with 2⅜" cutting capacity. Base adjustments: 0° to 2⅜" vertical depth of cut; 0° to 45° bevel adjustment; 2⅛" depth of cut at 45°. Free speed of blade: 3000 r.p.m. Overall length: 18". Weight: 17¼ lbs.



SKIL Drill Model 80—Standard duty ½" drill. Capacity in steel: 3/64" to ½"; in hardwood: 3/64" to 1¼". No-load speed: 450 r.p.m. Overall length: 11½". Weight: 8½ lbs.

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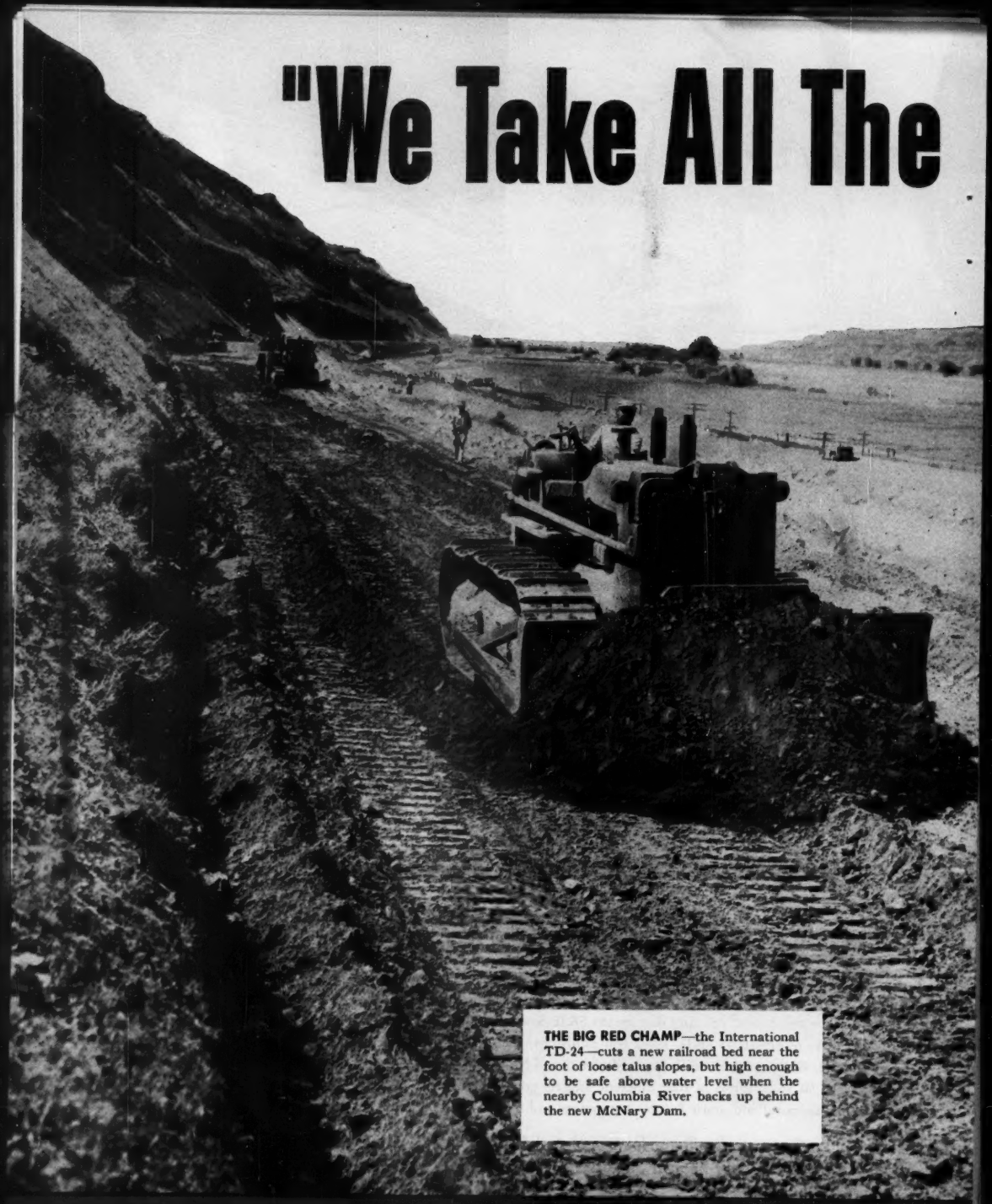
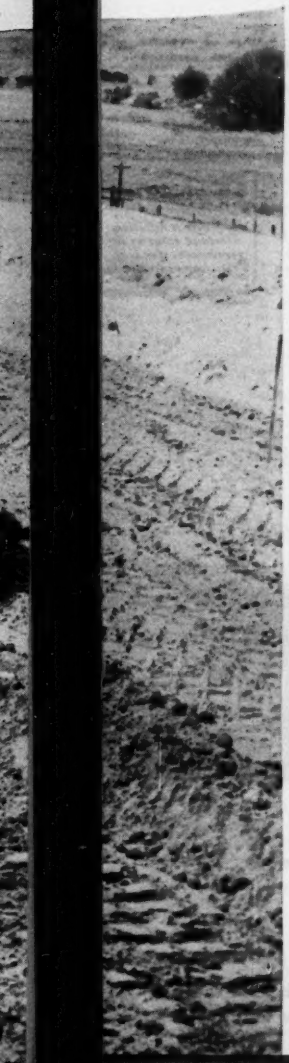


THE BIG RED CHAMP—the International TD-24—cuts a new railroad bed near the foot of loose talus slopes, but high enough to be safe above water level when the nearby Columbia River backs up behind the new McNary Dam.

TOUGH JOBS"

One man and his Big Red TD-24 handle hardest assignments for western contractor



Out on the big Union Pacific relocation job north of the McNary Dam site, Cardon & Cox—subcontracting for Utah Construction Co.—have an International TD-24 shuttling back and forth from one end of their section of the project to the other, doing the hardest jobs wherever they may be.

TD-24 operator Wilbur Strootman says, "We take all the tough assignments, and do them faster and better than any other tractor on the job. This TD-24 is the best tractor I've ever been on. I really go for it."

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TD-24 Speed—8 forward speeds, 8 reverse. Moves loads faster, gets back faster for a faster work cycle.

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TD-24 Steering—Fingertip steering for pivot turns, feathered turns, turns with power on both tracks.

TD-24 Starting—Quick push-button starting in any weather.

Want to know more? Ask a friend who owns a TD-24. And ask your International Industrial Distributor both about the TD-24 and about his fast field service and complete shop facilities. You'll be a TD-24 man from then on in!

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gives you a higher ratio of lifting capacity in relation to gross weight . . . lets you work faster!

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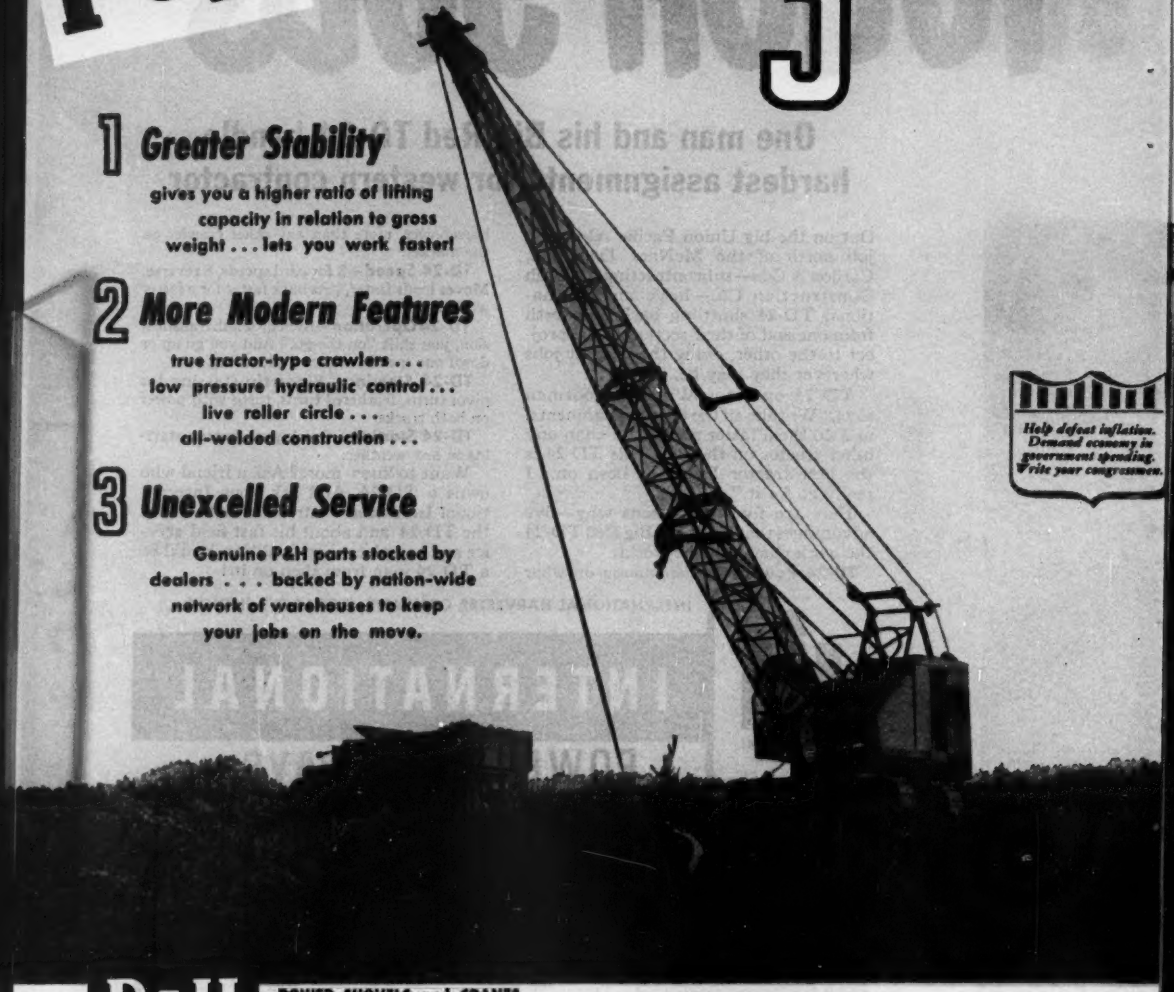
Genuine P&H parts stocked by dealers . . . backed by nation-wide network of warehouses to keep your jobs on the move.



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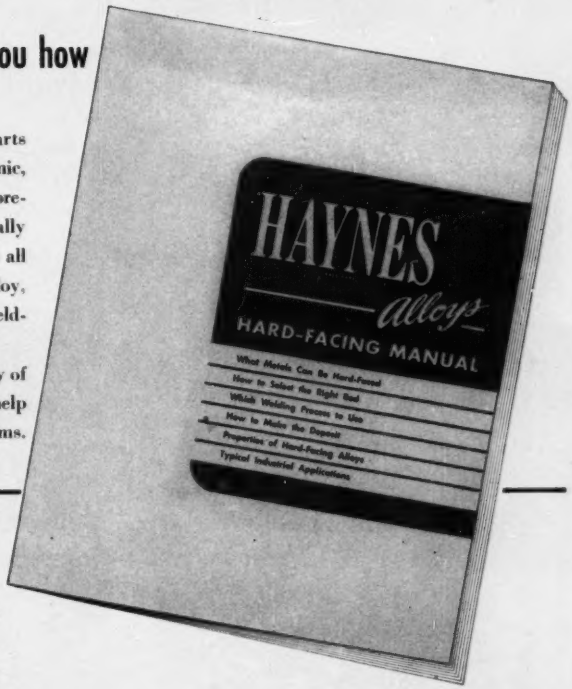

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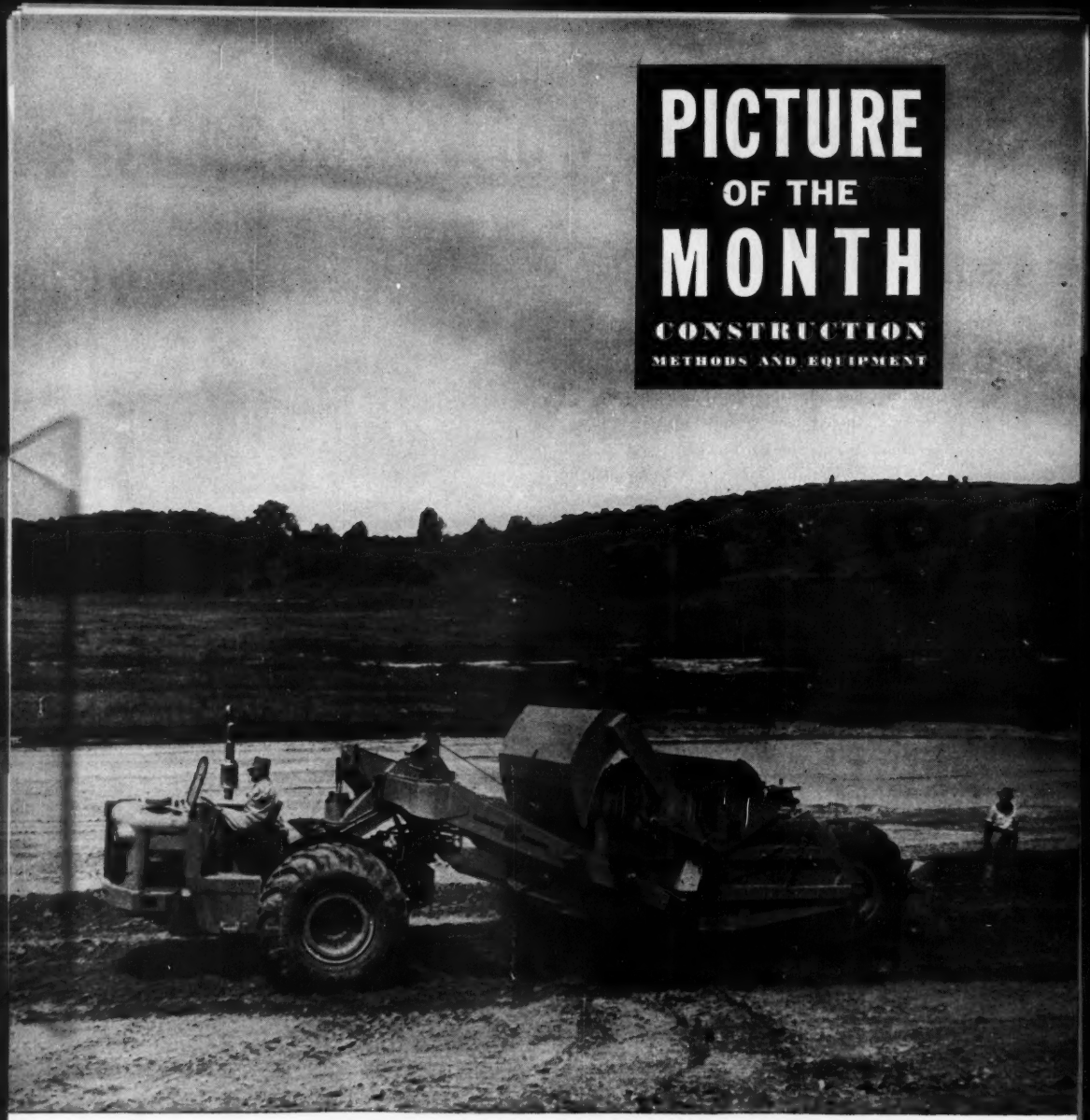

Seeing is Believing!
Here's a One-Armed Scraper Operator

THE EASE with which modern construction Juggernauts can be operated through power controls is graphically illustrated by this shot of one-armed Homer Fleming at the wheel of a La-Plant-Choate TS300 scraper. He is a regular operator for McCrady Construction Co., Pittsburgh, on the Shawnee State Park Flood control reservoir near Bedford, Pa. Between cut and fill Fleming drives the rig with one hand. When manipulating the power controls for loading and dumping — at slow travel speed, of course — he steers the tractor with his knees. Here's evidence that the physically handicapped worker has a place in construction.

DURAPLASTIC Aids Proper Concrete Placement in World's Biggest Bus Terminal

● To get a more uniform, more workable mix for New York City's new $24,000,000 bus terminal, Turner Construction Company used Duraplastic* air-entraining portland cement—31,000 barrels in all. Duraplastic requires less mixing water for a given slump. It gives a more plastic mix. Such mixes aid proper placement... result in an improved surface appearance.

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General Contractor: Turner Construction Co., New York, N. Y. Ready-mixed concrete supplied by Metropolitan Sand & Gravel Co. New York, N. Y.

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It sells at the same price as regular cement. Complies with ASTM and Federal Specifications. For free booklet telling how Duraplastic can help you on your next job write: Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

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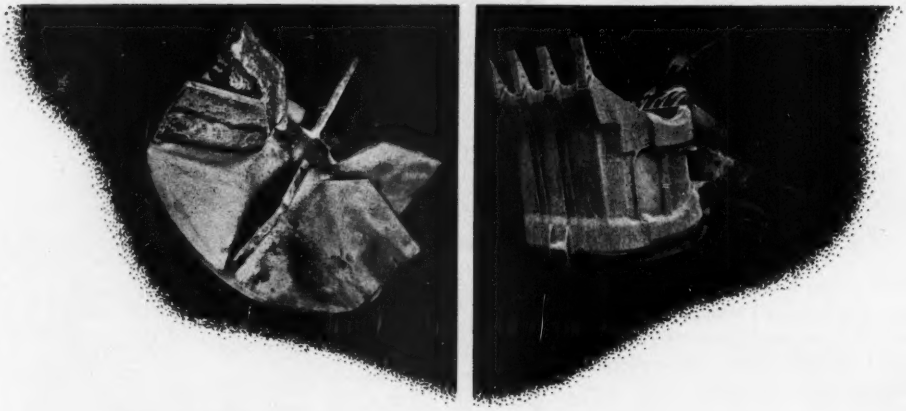

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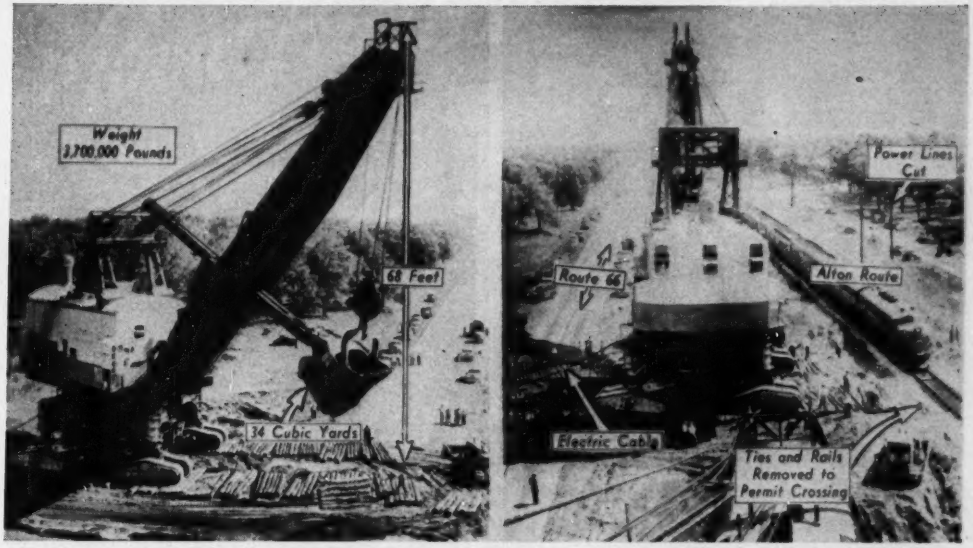
AR-3

Construction News in Pictures...



INCHING ALONG—Highway and rail traffic were halted to permit the 1,850-ton electric stripping shovel of the Northern Illinois Coal Corp. to cross Route 66 and the Alton while being moved from Coal City to Essex, Ill. The 34-cu yd giant was moved under its own power on the 10.8-mi journey. Electricity was furnished by a mobile substation (lower right). When shovel reached end of power cable, substation moved forward to tap transmission lines at new location. Timbers, cabled together, formed travel pads to support the weight of the heavy crawlers and were moved from rear to front as the shovel inched along.—Wide World

MORTAR MIXER—Masonry contractor, Albert Hallert of Oakland, Calif., mounted a 25-cu ft mortar mixer and a used 4-cyl Le Roi engine on a built-up steel frame. Units are coupled by an old truck transmission. Operator A. Flecher stands beside 3-wheel, self-propelled machine.

MULTI-STRIPER—Double center dividing lines and two single lane markers are laid simultaneously by a road striper developed by Carl G. Sohmer, of the Tacoma, Wash., Police Department. Operators on rear control spray from 5-bbl paint tank. —Wide World

MUCH WEEPING—Water gushes from a large collector pipe as it drains from weepholes in three cells of the cofferdam at Chief Joseph Dam on the Columbia River near Bridgeport, Wash. Construction men building a retaining wall and excavating for the base of the dam were hampered by water discharging from weepholes at a rate of 1,000 gpm. The contractor, Chief Joseph Builders, solved the problem by welding two studs alongside each weephole, putting a flange between the studs and a nipple around the hole. Water from weepholes was directed to large pipe by hose and pipe connections.

(Continued on page 38)

ON THE MOVE—Four-story, 72-room Olympic Hotel being towed across the street in Oakland, Calif., to make room for a new freeway. Ground floor was knocked out to accommodate timbers that support weight of the building. Building rolled on 600 hardwood rollers; two large trucks provided motive power. Shifting of the 30,000-ton structure was handled by R. B. Montgomery, house-moving specialist.

DRILL RIG—Joy Drill and boom, attached to the rear of a Euclid tractor, is used by the S. A. Healy Construction Co. to shape stone to riprap the upstream side of the Neversink Dam in New York. Air to operate the drill is supplied by two 1,000-cfm Ingersoll-Rand compressors and the boom is controlled hydraulically. Hydraulic oil pump is mounted on tractor ahead of rear axle, is operated by power takeoff from the transmission.—Castro photo

GRAVEL PRODUCTION—Gravel-pumping dredge was built around one General Motors 6-110 diesel engine which operates the main pump, priming pumps, stone ladder and winches, through a system of power takeoffs. Unit was built for Consumers Sand and Gravel Co., Kalamazoo, Mich., by the Earle Equipment Co., Detroit. Dredge is 100 ft long, 16 ft wide and built of 5/16-in. plate. Suction pipe is 75 ft long, will dredge 50 ft deep. Concrete tunnel in background houses part of conveyor system on land.

About Pumping Costs.....

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✓ better equipment costs more to make.

But

MORETRENCH IS LOW in FINAL COST because

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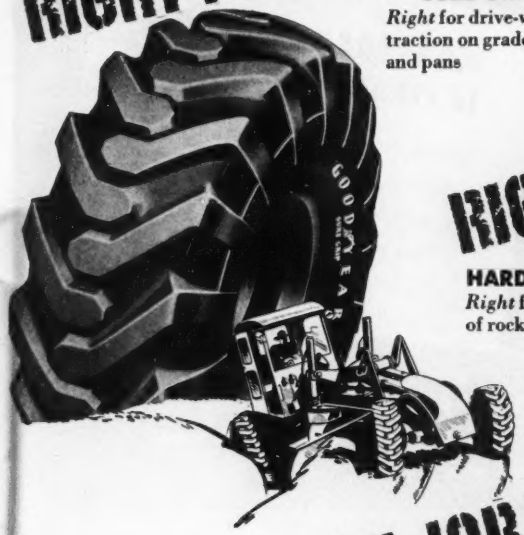

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GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

Volume 33
Number 12

CONSTRUCTION
METHODS AND EQUIPMENT

DECEMBER
1951

Harold W. Richardson, Editor

Something's Cockeyed

WHENEVER AMERICA gets into a real jam we always seem to bull our way out, usually the hard way. That's the only ray of light penetrating the murky fog engulfing and choking us as we round out the first full year of government control of industry under the Defense Production Act of 1950. Congress, through the Act, called upon the country to mobilize for defense.

But the Administration has played footsie with mobilization intentions. It has never really made up its mind whether the defense program comes first, or whether we can sort of mosey along as usual, live as usual with our right hand and mobilize as convenient with our left hand. Lacking decisive leadership, of course, the people cannot make up their minds either. Probably the first big step towards the present confusion was the President's insistance on placing all control and administrative agencies within existing government departments—contrary to the WPB experience of the last war. This, of course, shot the program full of bureaucratic and political holes right off the bat. As a result, plans have been made, started, changed, and stopped with bewildering suddenness. Actions taken yesterday are smothered today because of outcry from politically important interests. Top administrator Charlie Wilson and his lieutenants have one hell of a time accomplishing anything in such an atmosphere, no matter how hard they try.

To achieve the Defense Act's purposes within sensible limits of cost and time no doubt requires: (1) Some kind of wage and price control; and (2) materials and production control to a certain extent. But something's cockeyed in the way these controls are being administered.

Something's cockeyed when steel companies report a falling off in structural demand and yet stated requirements for first quarter 1952 are 1,732,000 tons and allocations are only 58%, or 997,000 tons.

Something's cockeyed when top NPA officials overlook highways as an essential mobilization factor and allocate only 28% of steel needed to build up and maintain our vast road system.

Something's cockeyed when uninformed NPA officials state that since commercial building is being cut way back, there will be little need for construction equipment. So construction machinery is lucky to get 75% of requirements of all steel and 36% of its structural needs next quarter.

Something's cockeyed when steel requirements run from 156% to 205% of steel capacity, for we have never been able to chew up anywhere near that much steel in the past.

Something's cockeyed when construction alone asks for 1,400,000 tons of structural steel for next quarter, for we have never used and erected more than 670,000 tons in any quarter heretofore.

Something's cockeyed when the steel companies are yelling for scrap, and shipbuilding has been cut to half of order schedules, yet no attempt, to our knowledge, has been made to scrap any of the hundreds of Liberty ships rusting away in estuaries on both coasts.

Something's cockeyed with our construction labor control the way we are coddling workers with scores of fringe wage benefits, such as extras for traveling to and from the job, for living on the job, for living off the job, for meals on or off the job, for welfare funds that will probably never benefit the worker, and for exorbitant overtime rates. Once we had the naive idea that the traditional wide spread between industrial and construction hourly rates sort of took care of the inconveniences of working on construction.

Something's very cockeyed when we let a gang of petty local labor leaders, suddenly thrust into big time, sabotage vital atomic energy and defense industrial plant construction with senseless bickering and useless crippling strikes.

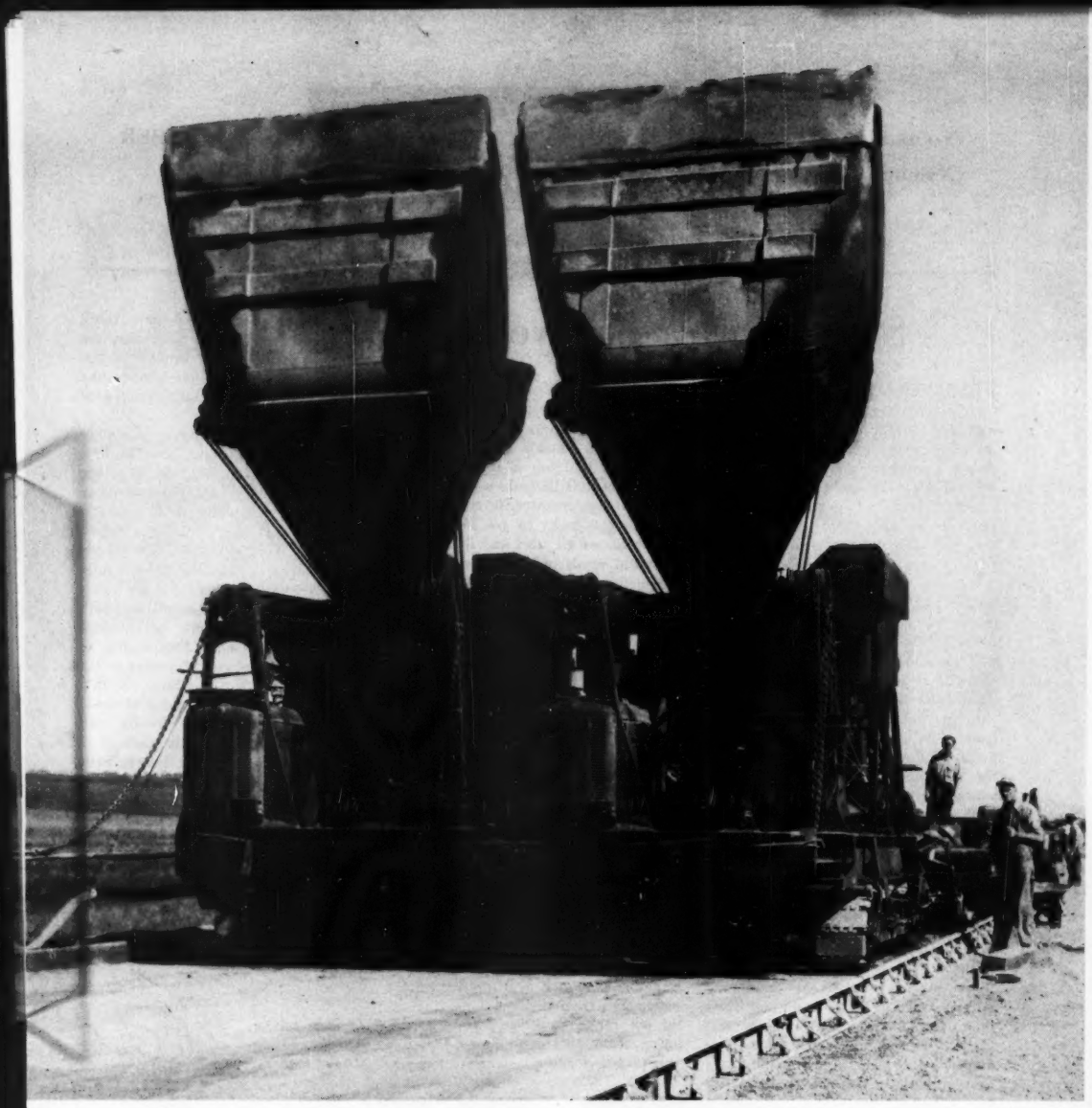
All in all, we're in quite a mess the way we are juggling the defense program. What to do? Make up our minds that if mobilization is necessary, let's get the job done. Let's get it done quickly and efficiently. Presumably we are mobilizing because of danger to our nation and to World Peace. If that danger is real, let's get going in sensible fashion—for danger doesn't wait until we can leisurely take care of it. Let's forget politics and bureaucratic jealousy in this big job. Furthermore, so long as industry, from raw materials to finished product, is so much involved, let's utilize the brains, know-how and advice of industrial leaders who have struggled with these very problems for years. This is a job for professionals, not amateurs.

But something's cockeyed with the way we are now performing. Something? Hell's Bells, just about everything's cockeyed!

Rich

Merry Christmas to All

AS WE ONCE AGAIN *celebrate the birthday of the Prince of Peace, may His blessing fall on you and your loved ones, wherever they may be, and upon all peoples in a troubled world as a comforting mantle to give one and all peace, courage and happiness. What a world this would be if nations and governments and individuals would follow and live His principles and teachings. May you all shed your burdens, forget your troubles and rest your soul for a moment on glorious Christmas Day. The entire staff wishes each and every one of you a Merry Christmas and Happy New Year!*



Why and How Western Contracting Corp. Runs Two Pavers Between Road Forms

. . . Denver-Boulder Turnpike Is a Good Example

JOINED FORE AND AFT for travel as a single unit inside the forms, twin Twinbatch pavers march down Denver-Boulder Turnpike laying a half-mile of 8-in. slab in 24-ft strips behind them each day. Pavers each place concrete in their half of double lane. Pavers are fastened together (opposite page) both front and back by pinned I-Beams at main frame level. Machines move together with travel controlled through air controls by operator of mixer at right, who can see forms, not visible to other operators.

CAPITALIZING on recent experiences and tests in operating two Koehring 34-E Twinbatch pavers on the subgrade within the road forms, and cleverly hooked together to travel as a unit, Western Contracting Corp., Sioux City, Iowa, completed paving of the 4-lane Denver-Boulder Turnpike on schedule. Despite the wettest spring and summer Colorado's east slope has seen in many a year, the state's first toll superhighway will be opened late in December. Bad weather not only disrupted grading, and thus got paving operations off to a late start, but also constantly delayed slab laying. Delays in steel shipments for bridges prevented opening the road as planned in November.

The turnpike extends 17½ mi from Federal Boulevard on the northern outskirts of Denver to Baseline Road in Boulder. A superhighway connection into downtown Denver, known as Valley Road, was started, but is now postponed because of lack of materials. While the turnpike was sponsored by the Colorado State Highway Department, Mark Wattrous, chief engineer, design and construction supervision was handled by the Kansas City office of Howard, Needles, Tammen and Bergendoff, consulting engineers. R. N. Bergendoff was in general charge for the consultants, with B. Hudgins as project engineer on the job.

The pike consists of two 24-ft lanes of 8-in. concrete paving separated by a 20-ft landscaped center mall. Dummy joints were cut into the pavement longitudinally down the center of each 24-ft strip and laterally every 15 ft. The paving contract also included a 6-in. heavy stone ballast course and a 1-in. sand cushion beneath the slab. Paving started July 13, and averaged 2,700 ft of 24-ft strip per working day.

Feature of the paving operations was hooking two Koehring 34-E Twinbatch pavers together to operate on the sand cushion subgrade between the forms and to travel as a single unit. The best explanation of why and how the contractor did this comes from M. F. Warner, office engineer for Western Contracting Corp. Here it is in his own words:

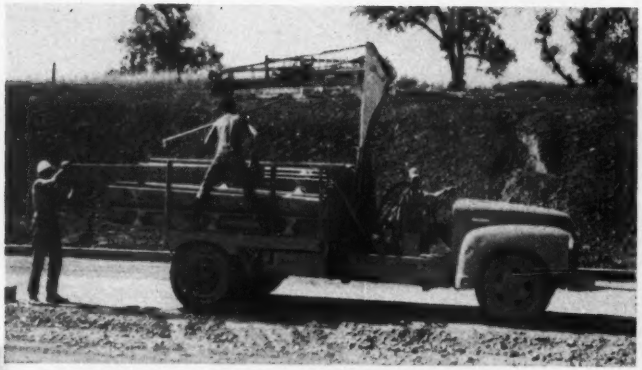
Why two pavers?

"The construction industry as a whole is constantly developing ways of increasing the amount of work that can be done during one construction season by a single crew. By performing a large volume of work in one season, as in the case of the 501,700 sq yd on the Denver-Boulder Turnpike, the contractor is able to spread the high equipment plant cost and overhead expense over a large pay yardage. The saving, being reflected in the contractor's bid prices, is passed on to the contracting agencies, resulting in more work performed for each construction dollar. In the concrete paving field, the contractor is able to increase greatly the production potential of a crew by using two pavers."

Why operate two pavers between forms?

"In the operation of two pavers on a concrete paving project, usual standard practice is to work the pavers from the shoulders. However, in order to operate efficiently from the shoulders, the terrain must be fairly uniform, also well drained, with a roadway cross-section of flat fore slopes and ditches, affording easy access to any point on the job for the batch, water and form trucks.

"The method of operating the two machines between the road forms was developed to eliminate the terrain hazard of two-paver operation. That is, regardless of the terrain, by operating the two pavers between the road forms, the shoulders would always be clear to handle the truck traffic. The Denver-Boulder Turnpike Project, because of the 88-ft roadway width, could have been paved with two pavers operating either outside or inside the road forms. But after completing 750,000 sq yd of pavement by operating between the forms in 1949 and 1950, we elected to do this project in the same way with two Koehring 34-E Twinbatch pavers as the most efficient method."



HYDRAULIC CRANE on special truck turns hard work of pulling, hauling and distributing heavy 8-in. forms into fast, easy work. Rolled stone sub-base makes excellent haul road for this rig and batch trucks.

FORM SETTING is speeded up by this pin-driving outfit of Joy hammers and Jeep-mounted Jaeger 105-ft compressor. Without

What are the form clearances?

"Today's concrete pavement has been standardized on 22- and 24-ft widths. Therefore, after deciding to work the pavers between the road forms in order to insure versatility, it was necessary to organize the equipment on the basis of the minimum or 22-ft width. The Koehring 34E twinbatch paver skip is 10 ft wide. Therefore, the two skips alone take up 20 of the 22-ft width, leaving only 2-ft clearance between pavers and road forms."

Why hook the two pavers together?

"Operating controls for the pavers are on the right side of the machine; therefore, the operator of the left-hand paver would be situated at center of roadway and could not see out well enough to keep the paver traveling in a line parallel with the road forms. Thus, in order to eliminate the probability of the pavers climbing all over each other, and also the road forms, it was decided to hook the two pavers together in parallel."

How were they hooked together?

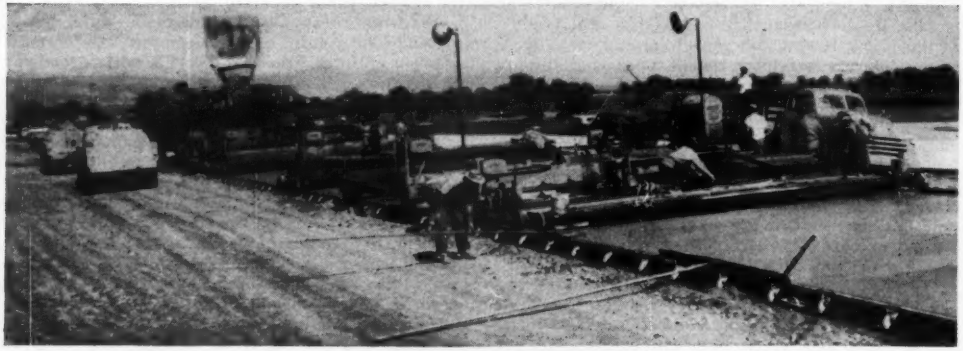
"The two pavers are joined with pin-connected steel I-Beams set transversely across the front and back of the bed frames. Mix-water for both machines is supplied by a common water line running under the front I-Beam connections. The operator of the right-hand paver regulates the travel of both machines by pneumatic controls.

"Hubert H. Everist, Jr., our Equipment Superintendent, handled the design and fabrication of the paver hook-up."

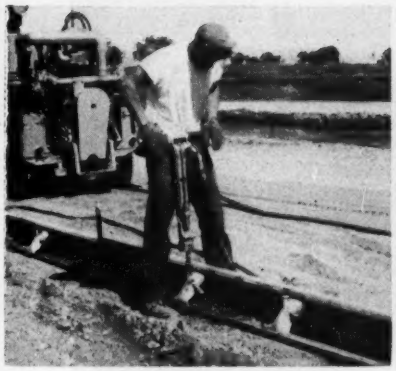
There, you have the reasons and the procedure right from headquarters.

Western opened up a beautiful sand and gravel pit not far off the road about midpoint along its length, and set up a batch plant here. When the haul reached the maximum of 9 mi, 44 batch trucks, mostly rented, were needed to keep the two pavers going.

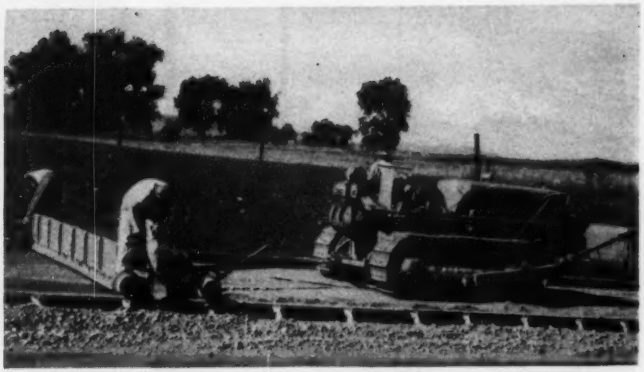
The ballast course was spread and rolled without forms. This meant that pins for the 8-in. Heltzel road forms had to be driven down through the stone base. But this proved not too difficult with Joy pneumatic pin drivers getting air from a 105-ft Jaeger compressor



IT TAKES A BIG ARRAY of equipment—spreader, two transverse and one longitudinal finishers, and dummy-joint setting machine—to finish up the slab behind two fast-moving pavers. Joint machine carries generators and lights for possible night work. Final touch to surface is given by hand floats. Fleet of big tank trucks supplies water for twin mixers.



pneumatic hammers pin-driving would be difficult through stone sub-base. Long hose lines minimize compressor moves.



SAND FOR CUSHION between rock base and concrete slab is roughly spread by Cat bulldozer, then is leveled and screeded to 1-in. final thickness by two passes of adjustable screed pulled by same tractor. As spreader rides forms, thickness can be controlled.

mounted on a Jeep. Forms were pulled, hauled and distributed by a special Chevrolet stake-body truck equipped with a hydraulic hoist on a swinging boom.

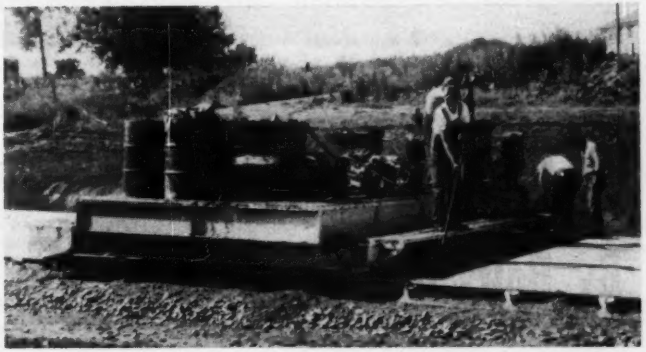
After the forms were set, the 1-in. sand cushion was roughly spread by a Cat D8 bulldozer. Then a homemade spreader with adjustable blade, riding the forms and pulled by the tractor, leveled off the sand. A second pass of the spreader with blade set to proper clearance, struck the cushion to exact thickness and perfect smoothness.

Following close behind the pavers were one Blaw-Knox spreader, two Jaeger-Lakewood finishers, a Koehring longitudinal float and dummy joint-forming machine. Farther behind was another self-traveling platform carrying a compressor for blowing out the joints with air jets and a joint compound heater. This crew sealed the joints as fast as they were cleaned out. Hunt Process Co., Los Angeles, was subcontractor on joint sealing and slab curing with the Hunt process.

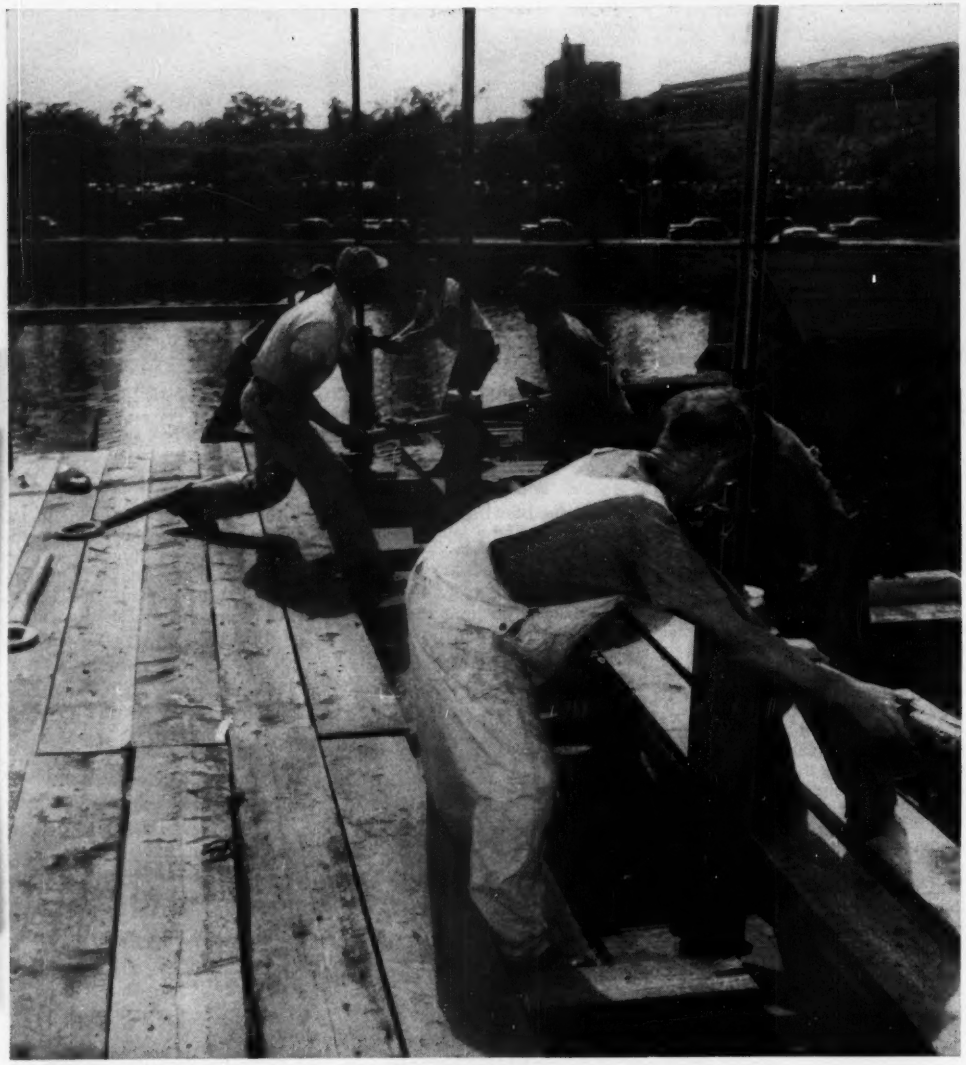
These men made up Western's supervisory staff: L. C. Shellman, superintendent; Matt Zittritsch, concrete foreman; Roy MacArthur, grade foreman; Lloyd Klingensmith, plant foreman; Don Finch, truck foreman; Guy Pinkman, master mechanic; and Vance Cauble, office manager.

WAY BACK down the slab this crew with traveling catwalks pulls dummy joints from partly set concrete.

BOSS OF THE WORKS for Western Contracting Corp. on the Denver-Boulder Turnpike paving is superintendent L. C. Shellman.



COMPACT TRAVELER carries compressor for cleaning out open joints with air jets, and heater for joint-sealing compound. Self-propelled machine helps crew keep pace with rest of outfit. This work and application of Hunt curing process is by subcontract.



27 Pair of Workmen Strain in Unison as . . .

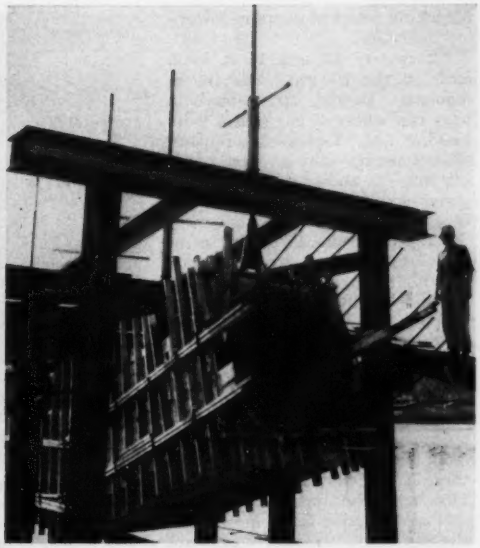
300-Ft Pipe Is Lowered By Bolts to River Bed

By JAMES M. CONNOLLY
Associate Editor

HAD MERRITT-CHAPMAN & SCOTT CORP. been able to bring its huge floating derricks up river, the job would have been simple and no cause for concern. Lowering a pipe to river bottom is an easy job for these seagoing giants—even a pipe 300 ft long, 5 ft, 4 in. in diameter and completely incased in concrete. Since the rigs were denied access to the job because of low-lying bridges across Boston's Charles River, the contractor had to figure out another way—and did!

The job was to install a 544-ft run of pipe in a trench 30 ft below the river surface to replace two 36-in. mains now carrying water from Boston to Cam-

WIRE ROPE SLINGS encircle 5-ft, 4-in. pipe, incased in lower half of concrete pour and joining at triangular plate hung from clevis at bottom of threaded rods. Job-made wrenches turn bearing nuts to lower pipe slowly to trench 30 ft below the water.



BENTS ARE AT 8-ft centers inshore where they support rising end section; at 12-ft centers out to midstream. With steel bulkheads welded at each end, pipe was lowered to half-way mark in water for buoyancy, then top half was poured.

WHEN PIPE SANK below surface, extension rods were attached for remainder of drop. Here steel rods have been inserted in pipe sleeves on wrench to produce added leverage. Note protective paper wrapping over greased rod and chalk marks every foot.

bridge. It required a 10-in. casing of reinforced concrete and a 2-in. Gunite lining. Here's how they accomplished it:

After deciding to install the pipe in two sections, each almost 300 ft long, they dredged out the trench across the river. Starting at the Cambridge end, two lines of steel H-piles were driven out to the midway point of the stream, one line on each side of the trench. These were on 8-ft centers near shore, then changed to 12-ft centers in mid-river. Capping each pair 17 ft above the surface of the water was a horizontal H-pile which completed the inverted U-frames. One working platform was erected between the pile lines about 3 ft above water, extending out to the end in midstream. Another was erected atop the pile bents.

One by one, 34-ft sections of pipe were skidded out along the lower platform, placed on 10x10's and welded end to end. When the entire 300-ft run was thus secure (with a 50-ft end-section rising up at approximately 45 deg to enter a trench ashore) both ends were sealed with watertight bulkheads to create buoyancy later.

Next a wire rope carrying-sling was passed under the pipe under each of the 27 pile bents, and connected to a triangular plate which, in turn, engaged a clevis at the bottom of a threaded rod. These rods were

the whole secret of the pipe-lowering operation.

Alternately 12 and 14 ft long, each of the 27 rods, 2½ in. in diameter, passed up through a bent cap where it engaged a 6-in. bearing nut. T-shaped wrenches were made up—one for each bearing nut—as shown in the accompanying photos, to provide the leverage for lifting or lowering. Steel rods previously placed in the pipe arms of these wrenches could be withdrawn, as needed, for additional leverage.

With the bolts and slings in place, a webbing of reinforcing steel was put around the pipe and inclosed with an octagonal-shaped form for pouring. The first pour took 130 yd. Concrete was mixed ashore and bucketed by a barge-mounted crane into buggies. From there it was chuted into the 300-ft form from the upper deck. At the end of this pour the concrete was slightly above the half-way mark —just high enough to cling to the pipe and not fall away.

To minimize the strain on the entire lowering setup the pipe was then wrenched up a few inches, the lower working deck removed and the partially-incased line lowered into the water where buoyancy supported about 1/3 of its weight, then estimated at 350 tons. With the pipe thus awash, 120 yd of concrete were poured for the top half of the casing.

"Lower Away!"

Then came the lowering operation. Two men manned each of the 27 wrenches and at each synchronized signal from two control men, took two complete turns. Thread pitch on the rods was 4½ per in. and the lowering was handled at a rate of approximately 1 ft/hr. As the pipe casing disappeared below the surface of the water and complete buoyancy supported half the entire weight, the 12-ft rods passed through their bearing nuts, leaving the pipe suspended from the ends of the 14 alternate longer rods.

As prearranged, threaded couplings were screwed on the tops of the 12-ft rods; then holes were drilled through both sleeve and rod and a steel bolt inserted. Next a set of 24-ft extension rods was screwed down through the empty alternate bearing nuts and into the top half of these sleeves. The process of drilling and bolting was repeated on the upper half, but only after all slack had been taken up and while a strain was held on the bolts. This prevented any slapping effect later which might shear the bolts and it produced the same immovable effect of double nuts on a bolt.

SYNCHRONIZED SIGNALS were rehearsed by Charlie Richardson (left foreground), project manager and Jesse Comer (left rear), his job super. At each sound of "Ho", two complete turns were taken by each of 27 pairs of jockeys. First 300-ft section is now in place, with work progressing rapidly on second half.

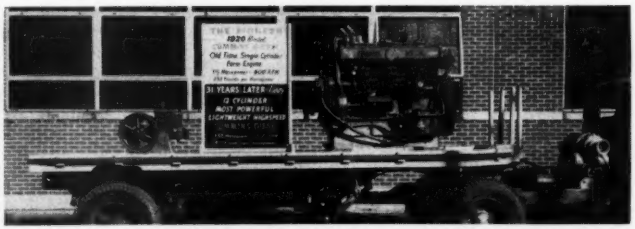
As the lowering continued slowly and surely, the 14-ft rods passed through their nuts and were disconnected, leaving the alternate 36-ft spliced rods to complete the lowering into the trench bottom without incident.

Next step was construction of a semicircular cofferdam on the Cambridge end to allow work in the dry while the last 34-ft riser section was brought up to tie into a trench ashore.

With the Cambridge half of the pipe secure, bents were removed and transferred across the river with the exception of the last three in midstream. These will remain in place complete with their 36-ft bolts in case they are needed for final adjustment, when the two halves are concreted in mid-river with the aid of divers.

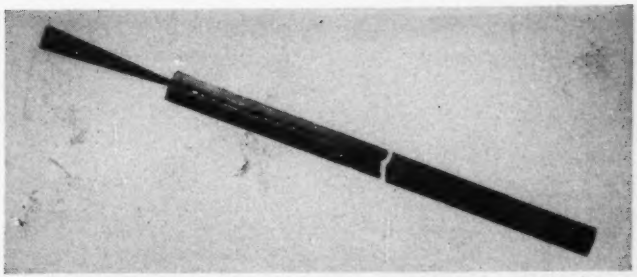
Charles A. Richardson of Merritt-Chapman & Scott's Boston office is project manager on the job with Jesse Comer his superintendent. Stewart Associates, Cambridge, Mass., are consulting engineers with A. L. Guild serving as resident engineer. Harold J. Toole, director and chief engineer of the Metropolitan District Commission's Water Division, is in over-all charge of the project and has C. O. Clark representing him in the field.

Cummins Diesels ... Then and Now



CUMMINS DIESEL ENGINE progress over the last 31 years is highlighted in this side-by-side display of the first model in production, a 1½-hp one-lunger for farm use, and the V-12 550-hp 1951 model for powering heavy-duty construction and industrial equipment. The 1920 model operated at 600 rpm and weighed 253 lb/hp; its high-speed descendant develops its power at 2100 rpm and weighs 8.3 lb/hp.

Steel Pins Support Bad Tunnel Roof



ROOF BOLT that supports spalling rock in Duchesne Tunnel is job-made of 1-in. round stock in 5- and 6-ft lengths. Flame-cut 1/8x6 1/2-in. slot takes 3/4x1 7/8x6-in. steel wedge.

STOPER DRIVES BOLT into pre-drilled 1 1/2-in. hole after drive head has been screwed on. Wedge expands bolt to hold it in hole.

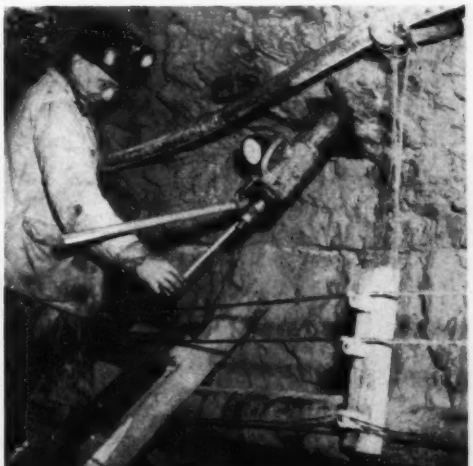
BOLTS HOLD ROOF by pinning several strata together. Before, rock worked loose in top to a V-shaped crown, weakening sides.

ROOF BOLTS proved a time and money saver in the U.S. Bureau of Reclamation's Duchesne Tunnel on their Provo River Project in Utah. The steel pins successfully held the roof of a 200-ft section in quartzite, which here had a tendency to pop when excavated and to slab off later.

This stretch of the 11-ft horseshoe tunnel was originally deemed sufficiently safe to leave unsupported, so was driven without space for roof supports. To save enlarging the bore to accommodate steel sets and lagging, the troublesome roof was pinned to strata above with 1-in. bolts 5 and 6 ft long. One end of the bolts was threaded; the other was slotted for 6 1/2 in. to take a steel wedge.

Wedge and bolt were slipped into a 1 1/2-in. hole that was stoper-drilled into the roof at right angles to planes of weakness in the rock. When the wedge-bolt was driven home against the end of the hole, the tip expanded to anchor the bolt firmly enough to withstand pull-out tests up to 13 tons. Square steel washers and a nut completed the assembly, preventing rock falls.

Duchesne Tunnel, a 6-mi bore begun in 1940 and discontinued during the war, will supply 600 cfs of irrigation water to areas between Provo and Salt Lake City. A $4,380,000 contract for its completion is held by Grafe-Callahan Construction Co., and Rhoades Bros. & Shofner, both of Los Angeles.



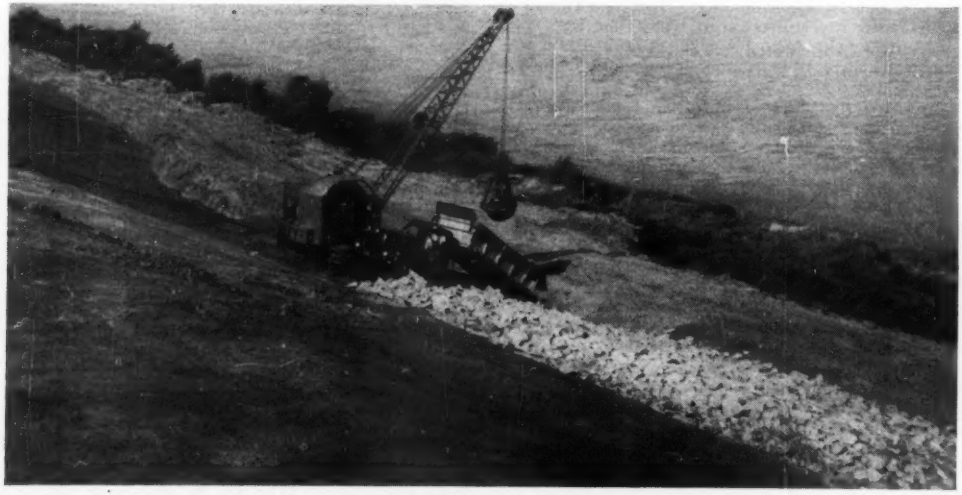
BOLT MOVEMENT IS MEASURED by Bureau of Mines engineer during pull-out test with 50-ton jack. This bolt in tunnel haunch, and others in roof, make it unnecessary to enlarge bore to set steel ribs that would be required otherwise.—All photos from USBR

1 EASY DOES IT! Rock-laden truck, snubbed by winch line from Cat D8 tractor, starts backwards down steep slope of Missouri River at Chamberlain, S. D., as first step in riprapping bottom bank area.

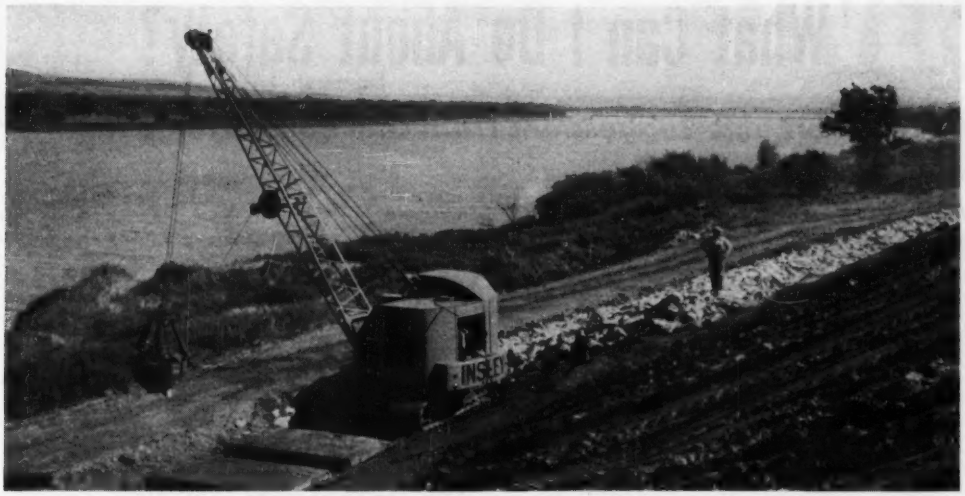
How They Place Riprap On the Big Muddy

PLACING HEAVY RIPRAP on a steep slope is one of the meanest of all construction operations. But Lindekugel & Sons Road Construction Co., Spencer, S. D., have devised a simple and efficient procedure for riprapping the Missouri River left bank just below Chamberlain, S. D.

They spot a Cat D8 at top of bank, and let a rock-laden dump-truck roll backwards down the slope, snubbed by a line from a Hyster winch on the tractor. The truck dumps the load in an open area, and is then snaked back up the slope by the winch line. Dumped



2 STEADY AS YOU GO! Tractor winch line eases truck into pocket between crane cribbing and placed riprap, and truck then dumps its load at bottom of rock blanket.



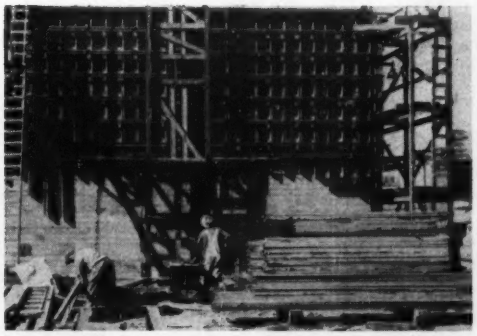
3 AFTER LOAD IS DUMPED, Insley crane starts placing stone with orange-peel bucket. Crane operates from mats on crib frames that can be leapfrogged by the rig, as stone blanket is extended. These are views of lower first belt; second will be adjacent up slope.

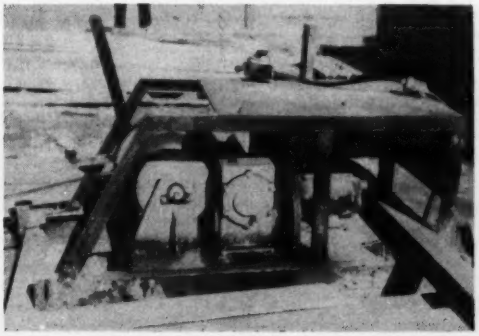
rock is placed in position, practically a stone at a time, with an orange-peel bucket on an Insley crawler crane set on level cribbing. The rock is being placed in two horizontal belts, first in the bottom belt along toe, then in a second strip farther up the slope. In each case the crane cribbing is moved horizontally at a constant elevation.

Ft. Randall Dam, being built by the U. S. Corps of Engineers nearly 100 mi downstream, will raise the water level at Chamberlain about 40 ft. To stabilize the reservoir banks a mile of high steep clay bluffs just below town is being sloped and riprapped with 3 ft of heavy rock to 5 ft above future water line. Slopes above riprap will be seeded with grass to prevent bank erosion.

G. E. Gulbranson is superintendent for Lindekugel on the job. George Evans is area engineer in charge of the whole Ft. Randall project for the Corps of Engineers, and L. W. McCoy is resident engineer at Chamberlain on the bank revetment, also on railroad and highway relocation and bridge projects necessary because of the new reservoir.

Job-Built Hoist Handles Lumber





JERRY DAWSON, job superintendent for Williams & Burrows, Burlingame, Calif., contractors, uses a simple timber hoist of his own design for building construction. The lift frame and cradle are made of wood; hoist frame is made of angle iron. Power is by a 1-hp 220-v electric motor driving the drum through a 7:1 Cleveland reduction gear. Capacity is estimated to be roughly 1,500 lb. Lumber is loaded across the supporting arms of the cradle, and the load is held away from the guide columns by retaining dogs. On arrival of a load at the floor selected, the dogs are tripped automatically and the contents of the cradle unloaded by gravity.

What Can I Do About Safety?

... Ten Workable Suggestions From One Contractor to Another

By JOHN A. VOLPE

"But what can I do?" That is the usual question asked by contractors when approached about a construction safety program. The following article tells you what to do. It is abstracted from an excellent speech made by John Volpe, Boston building contractor, before the Construction Section, National Safety Congress, at Chicago in October. John might be classed as an average, even small-size, builder. But his sound advice applies to all contractors—building, highway and heavy, large and small—and he practices what he preaches. Of all the words written and spouted about contractor accident prevention, these make the most sense to us.—EDITOR

SEVERAL YEARS AGO I was visiting a $4,000,000 addition which my firm was erecting at Beth Israel Hospital in Boston. My superintendent and I were on the sixth floor of the eight-story addition when we suddenly heard some screaming and, upon looking out the window, saw a man flat on his back on the hoisting tower platform at ground level.

We raced down the six flights of stairs. As we did, both Gus and I reflected on the wonderful record we had established on this particular project where we had no accidents whatsoever in connection with hoisting operations—which had involved the placing of thousands of yards of concrete and the hoisting of thousands upon thousands of brick plus other masonry materials. Upon arriving at the scene of the accident, we noted that fortunately the man was not hurt badly and everyone breathed a sigh of relief.

He apparently had been standing on the landing at the fifth floor and leaned forward slightly to speak to one of the men below, without realizing that the elevator platform was above him. The platform came down and just skinned his nose; he fell forward on to the platform and rode it down to the ground.

This man had been given proper instructions prior to being placed at work around the hoisting tower, but he made the mistake of forgetting his instructions. Another inch or two and he probably would have been killed.

This accident served, however, to strengthen my conviction that eternal vigilance is necessary if we are to prevent accidents.

During 1950 2,300 deaths and 205,000 injuries were caused by accidents in the construction industry. To be more seriously pondered is the fact that there were 93 deaths per 100,000 workers in construction, while the average of all other industries was 27. Only one industry, mining, had a poorer record: 110 deaths per 100,000 workers.

In the injury column our record is even worse. Our industry had the highest number of total injuries per 100,000 workers, a total of 8,300, the average for all industries being 3,360. The frequency rate for disabling injuries in construction is double the average of all industries.

Contractors must become more intimately acquainted with this problem of accident prevention. Although we dislike admitting it, there are fewer safety programs going on among construction firms than among the vast majority of other industries. This is paradoxical, because the need for good programs is far greater in construction operations.

It is difficult to say who is at fault. Certainly the need for an organized safety program as an integral part of construction activities has not been sold to the industry.

In my opinion, the following 10-point program, if promoted vigorously, will reduce the accident rate greatly.

1. Secure and Retain Top Management Interest

Perhaps the most difficult phase of an over-all effort in accident prevention is to secure and retain the interest and complete cooperation of top management. Generally speaking, presidents, executives and general superintendents of construction firms place safety in the background rather than in the foreground of their planning. They believe that production, personnel problems and difficult time schedules are far more important.

• **A fair profit** is the objective in the operation of every business. No business can last very long without a profit. Generally speaking, a profitable operation is an efficient one. Top management must be sold on the fact that a well-rounded safety program will reduce costs. Analysis has revealed that the direct cost of the average disabling injury is approximately

(Continued on page 54)

"Safety begins with the 'Old Man' and ends with the lowest paid man on the job."

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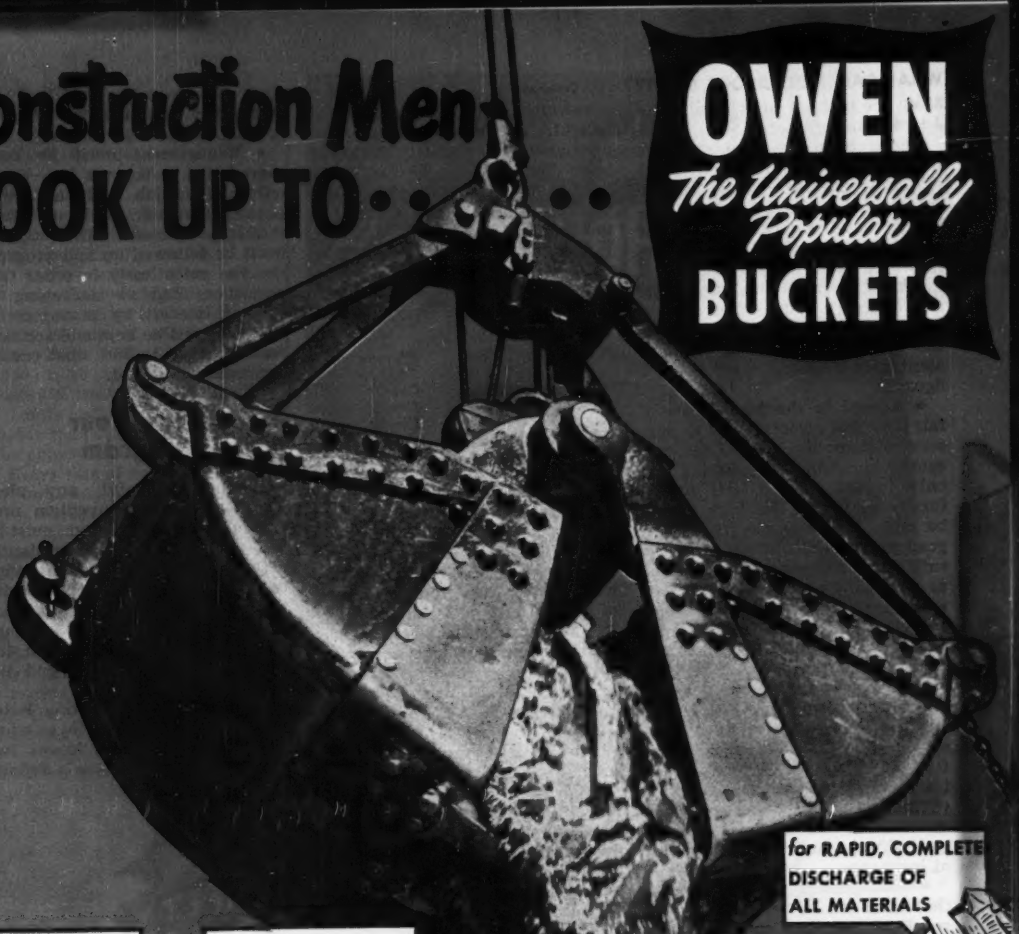

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$750; the indirect costs usually are 3 to 4 times greater.

Research on the subject shows that about 19 disabling injuries per million man-hours occur in the construction industry. It is believed that the spending of ½ of 1% of total payroll dollars on safety would result in a reduction of disabling injuries to 3 or 4 per million exposure hours. The savings in dollars, both direct and indirect, can be calculated. Top management must be made aware of these figures.

• **Appeal to the boss'** sense of fair play and responsibility to preserve human life. Each accident causes anguish and suffering not only to the injured, but to his family as well. The boss should be made to accept the fact that a good program would minimize the suffering. Although safety begins as a humane problem, its result is economic so far as the contractor is concerned. It sometimes becomes necessary to substitute dollars and cents for emotions to win management over to the side of safety.

• **Materials costs,** procurement and methods of contractors are similar, on the whole. A thousand feet of lumber will cost one contractor as much as another when estimating. The one variable which can be controlled most easily by the individual is the cost of insurance.

• **Management must be shown** that sales can be won or lost as a result of insurance costs based on accident experience. On a $1,000,000 job, compensation costs can vary with bidding contractors from $5,000 to $15,000. On a large job in the Boston area ($6½ million) the difference in the insurance premium on estimated payroll between the low bidder and the fourth bidder was $60,000. This is the difference between a 28% credit and a 27% charge.

• **On invitation bids** and cost-plus work, insurance costs are a major factor when closely qualified contractors are being considered. Most of the cost-plus work of a New England utility company is done by a contractor with a 38% credit—illustrating the point that "A safe job is an efficient job."

• **Safety begins** with the "old man" and ends with the lowest paid man on the job. We must not lose sight of the fact that any kind of a well integrated program must flow from top management through all operations. Without the full backing of management, accident prevention efforts will come to naught. The boss must convince personnel of his sincerity and never back down. While he can never hope to know what employees are thinking, they can tell what he is thinking.

• **As a concrete example** of how greatly underestimated are insurance costs, based on experience, here are my experience rates for the past 6 years:

1946	*13.2%*	*Charge*
1947	*16.0%*	*Charge*
1948	*9.4%*	*Credit*
1949	*23.8%*	*Credit*
1950	*2.9%*	*Credit*
1951	*5.8%*	*Credit*

You can see how inaccurate and misrepresentative a constant insurance factor of, say 7%, would have been over this period. You also can see how great the loss or savings, would be for a contractor who pays a compensation premium of $40,000 or $50,000 annually.

• **Hidden and incidental** indirect costs tie in with direct insurance costs. These indirect costs amount to 3 or 4 times the direct costs. Hidden costs are built up to a staggering sum through loss of production, time required to replace personnel, loss of expensive equipment involved in so-called "minor accidents," loss of supervisory time to investigate accidents and make adjustments, loss of employee time and efficiency during and after a serious accident—and so on down a long list.

Either curiosity or the desire to help causes almost everyone in the immediate vicinity of an accident to rush to the scene. Almost no one goes back to work until the injured man is carried off, or goes back to the job.

When the spectators do go back to work, they may be so affected emotionally that they cannot produce properly for some time. A recent survey by a large firm revealed that from 20 to 30 min of productive time is lost with even the slightest accident. These are some of the costs that go unnoticed and are never found when the annual profit is tabulated.

• **The over-all need for safety** in construction must be demonstrated to management. Insurance rates are based on the statewide experience of all contractors. If all contractors improved their accident records the over-all rates would go down state-wide. This may seem an insurmountable job, but the steel erectors in the midwest lowered their insurance rates when they instituted an effective accident prevention campaign.

• **Management must be convinced** that to begin a program is only half the job. Administration of the program is vital if any progress is to be made. The program must be followed up and progress checked relentlessly in order that employees find no slackening or loss of interest by management. Records must be kept and accident costs checked to find what results are being obtained.

2. Publicize Your Safety Program

To be successful, any plan, whether it be a convention program or a safety program, must be well publicized and kept constantly before the persons you are trying to reach. Our experience indicates that the following ten methods have played a great part in keeping a program constantly in the minds of our personnel and the public:

• **Prepare an interesting letter** to be given to each employee when he is hired so that he knows immediately that you have a definite

". . . he is now a member of the team, all of whom are expected to think safety and work safely."

safety program and are interested in his safety. Let him know that he is now a member of a team, all of whom are expected to *think safety and work safely.*

• **Distribute to each employee** on your projects a monthly letter telling him of the progress being made in accident prevention; list any lost-time accidents that have occurred and in general, work to get his cooperation with supervisors so that they and all concerned may enjoy a good record.

Invite the press and local munici-

pal officials to your monthly or annual safety meetings. Let the public know what you are doing to protect the safety of your employees and also their property and themselves.

• **A new job** may take us into an unfamiliar location where employees and conditions must be taken at face value. Many of us have experienced hostility from the residents of various towns and sections. We should not lose sight of the public relations angle and the good to be gained by informing strangers of the regard we hold for the safety of others. This is probably the easiest method to win public approval and acceptance.

• **Every sort of device** including pins, emblems, posters, signs and news pictures should be utilized in publicizing safety efforts. In the case of a large project, use a National Safety Council Jumbo Poster. One of the first things sent to all of our projects, even before equipment is sent, is a National Safety Council Green Cross Flag. In awarding pins or emblems for outstanding safety records, avoid using the "tin badge" variety. Spend some time and a little money on the design of these. After all, if a man has turned in an outstanding, money-saving accident record for us, the least we owe him is a pin he can feel proud to wear.

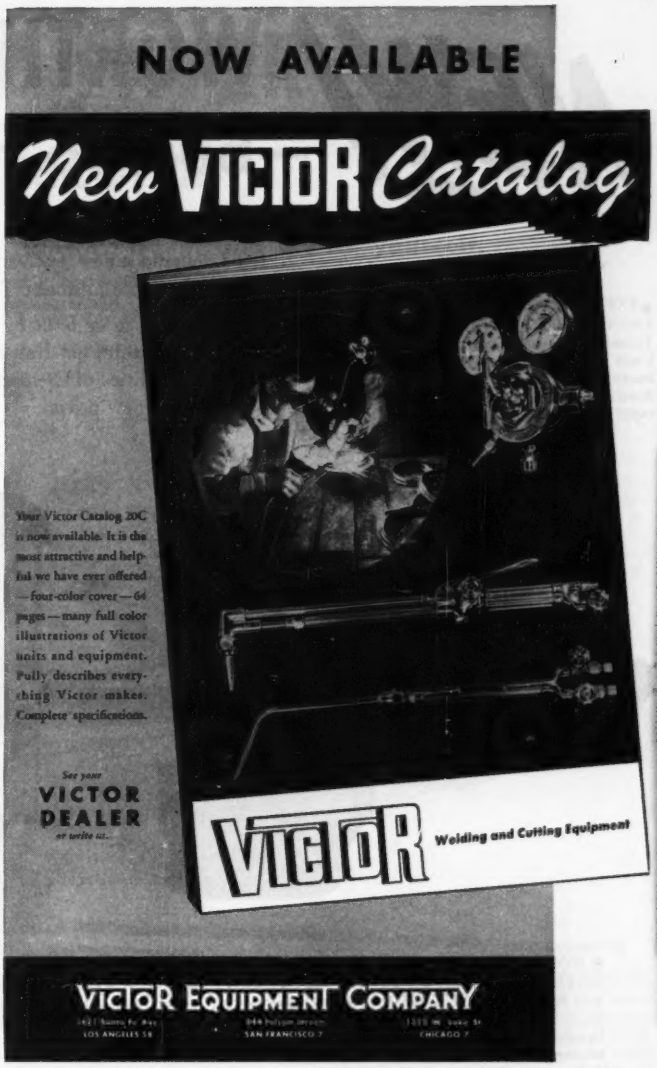
• **Join national trade organizations** and the National Safety Council. Become associated with groups working for the same goal in safety. Share in the help offered by the associations and draw on the wide and varied experience they have accumulated. They come up with good ideas which you can work into your own safety programs.

• **Deliver to each employee** a monthly booklet or magazine which further emphasizes your safety program. We have the "Safe Worker," a monthly booklet published by the National Safety Council, delivered to each employee each month.

• **When you suffer a serious accident** on one of your jobs, don't hide it! Write it up in an impersonal manner and post it on your jobs in order that your men can profit by it and avoid similar mishaps. Point out the causes, and the means and ways of correcting such a situation.

• **Construct an accident score board** showing how your safety program is working. I know of several contractors who would not

(Continued on page 58)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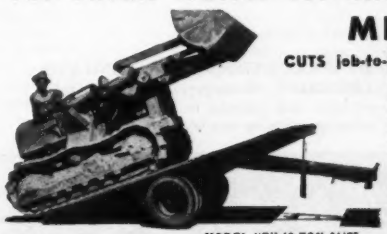
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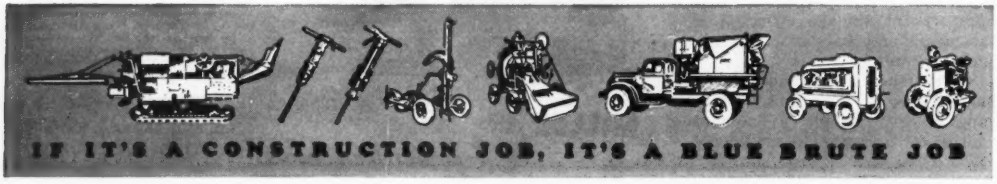
● **INSTANT, POSITIVE RESPONSE WITH SMOOTH, EFFORTLESS CONTROL.** Transfer and discharge chutes, water valves, boom swing, bucket travel and controllable bucket discharge, all easily operated with hydraulic control levers conveniently placed for rapid action.

● **ACCURATE, WEATHER-RESISTANT BATCH METERS** are unaffected by differences of oil thickness. Timing devices for both drum compartments built into single housing. Field trials of 75,000 batches prove reliability of these worm-gear-driven meters.

● **WORTHINGTON'S EXCLUSIVE HYDRAULICALLY CONTROLLED BOOM BUCKET.** No split batches in the mixing drum. Hydraulic gate control permits splitting batches in bucket without interfering with mixing cycle. Bucket doors can be opened any distance required to regulate flow of concrete. Concrete can be spread across runways up to 25 ft wide while paver operates outside forms.

● **RUGGED, RESPONSIVE BOOM-SWING MECHANISM.** Mechanism is hydraulically controlled, piston operated, bull-wheel type. Hydraulic cushioning prevents bent booms. No worm gears to break.

● **FAST, POSITIVE BOOM RAISING AND LOWERING.** Worm-drive mechanism fully enclosed and running in oil; operates only when booming up and booming down.



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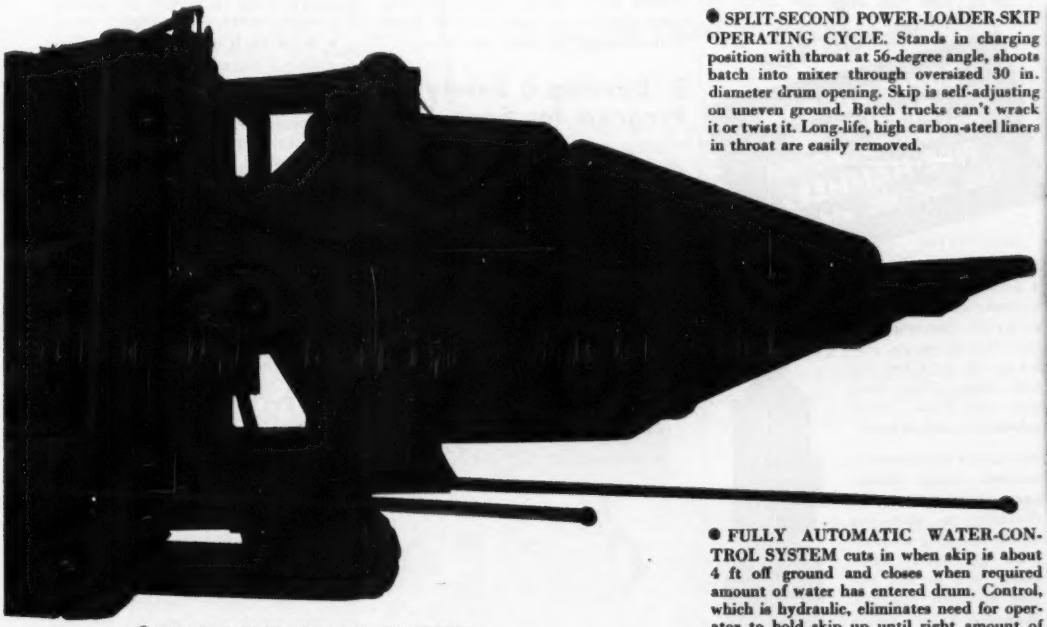
Check these features of this newest paver and see for yourself.

- Power loader skip takes only 6½ seconds from ground to discharge position of 56° on low slope
- Transfer from first compartment to second compartment approximately 6½ seconds, depending upon concrete consistency
- Discharge into boom bucket approximately 6½ seconds, depending on concrete consistency
- Boom bucket travel speed—256 ft per minute
- Hydraulically-controlled boom swing of 171°
- Can swing and spread simultaneously



● SPLIT-SECOND POWER-LOADER-SKIP OPERATING CYCLE. Stands in charging position with throat at 56-degree angle, shoots batch into mixer through oversized 30 in. diameter drum opening. Skip is self-adjusting on uneven ground. Batch trucks can't wrack it or twist it. Long-life, high carbon-steel liners in throat are easily removed.

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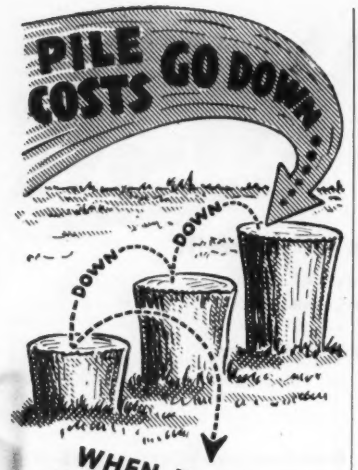

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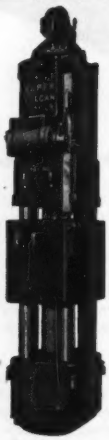

Sizes: 18C-30C-50C-80C meet all needs.

VULCAN IRON WORKS

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WHAT CAN I DO ABOUT SAFETY? . . . Continued from page 55

consent to such a procedure for fear of a poor opinion from both the public and prospective employees. It would seem that safety in construction is a sadly inadequate affair if we have to hush our accident records.

• **Make it difficult for accidents to happen**, but if they do occur, make it difficult for them to go unnoticed. Play up every phase of your safety program. Keep it before your employees and the public. When your accident record is good, publicize it, and when it starts going badly, let your employees know it. Strive to gain their cooperation in bettering it. Most of us will prod our men when things aren't going well, but let's not forget to pat them on the back when things are looking up.

3. Develop a Safety Program for Each Job

It is essential that we do not standardize safety operations to the point where they are supposed to run automatically.

• **Tailor job safety** to the particular job under construction. A general program does not always conform readily to particular operations. Personnel, operations, administrative setup and, most of all, individual jobs, have certain characteristics which must be considered in a smooth-running program.

". . . appoint a safety man or safety committee to guide job safety."

• **Capable personnel** should be assigned to safety work before actual operations are begun. Perhaps on small jobs, the superintendent can handle the safety program in addition to his many other duties. More often, it becomes necessary to appoint a safety man or a safety committee to devote some part of the work day to accident prevention and to guide job safety.

• **Impress safety on personnel** from the very beginning of the job. Usually, the most serious accidents occur during the initial rush to get a job started. During this starting period, safety many times is lost or forgotten in the setup of operations. Start job safety with the batter boards. The confidence of employees will be lost when safety is a "Johnny-Come-Lately."

• **Safety is everyone's job** and everyone's responsibility on a project. Be sure to impress that fact upon employees. Encourage them to make suggestions and to assume job safety as a personal problem. Require them to report all unsafe conditions to their foreman.

• **Plan each operation** and plan it safely before it starts, to avoid post mortems and expensive delays. In no other way will operations progress more smoothly than when planned with a built-in safety factor. Do we need more proof that the safe way is the best way?

• **Although there are certain differences** between jobs, there remains the general similarity of construction operations. To overcome the feeling that little can be done in accident prevention on the job, carry competition in accident records between jobs. If accidents can be held to a minimum on one job they can be kept low on another. Put the problem to the men on a personal basis so they will be instilled with some feeling of pride in keeping accidents down.

• **A weeky report**, signed by superintendents, should be submitted to the contractor . The report need not be lengthy but should summarize just what has been done safety-wise in all work classifications. The current accident record for the week also should be included. Such a device will force the superintendent to keep safety in mind during the week, for he knows that a report has to be written covering weekly operations.

• **Serious accidents** on a job should be investigated by the foreman involved and a report submitted by him. The report should cover the cause of the accident, how it occurred and, most important, what he has done to prevent a re-occurrence.

• **Signs and posters** should be posted conspicuously on the job site highlighting particular hazards on the job. But, if you are going to depend upon posters alone to promote safety, you are better off

to forget them. They are just the frosting on the cake and will serve their purpose only when used in conjunction with a sincere and well-administered safety program.

• **Have key personnel** set the example in safety precautions and expect other employees to do likewise. Warn them of the dangers of condoning an unsafe act or condition one day and condemning it the next. It will tear down the confidence and cooperation of the gang on the job. Procure for each superintendent and foreman a copy of the Associated General Contractors Manual of Accident Prevention. You will find it a worthwhile investment.

• • •

TO BE CONTINUED — Author Volpe will discuss four more of his ten suggestions for construction safety in the January 1952 issue of *Construction Methods and Equipment*.

Transmitters and Caps Together Are Dangerous

EXCERPT from a bulletin published by the U. S. Treasury Department, Bureau of Internal Revenue, Alcohol Tax Unit:

"A case of a fatal accident to a two-way radio-equipped vehicle which was being used to transport dynamite and detonator caps of the type wired for electric detonation has come to the attention of headquarters.

"In the subject case the vehicle was destroyed completely and all occupants thereof were killed instantly. No cause for the explosion could be determined until the equipment, materials and conditions were duplicated as nearly as possible and the radio transmitter turned on by remote control. The wires attached to the detonator caps formed a resonant circuit for the frequency of the transmitter, absorbed enough energy to explode the caps, which in turn exploded the dynamite."

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Equipment needs steel...
Steel needs scrap...

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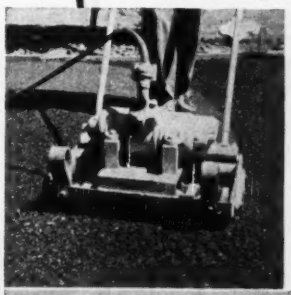
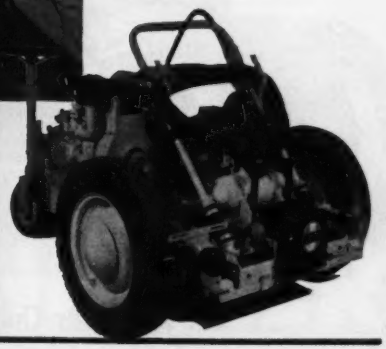


It's rugged and reliable. Has just one moving part — the shaft of the heavy-duty motor. Operates on 110 V. 3-phase, 60 cycle AC from Jackson Power Plant mounted on trailer, which generates both single and 3-phase current and may be also used to operate other tools and lights. Capacity: 2.5 KVA.

Trailer has hydraulic jack for quickly lifting and lowering compactor and is a great time saver on many types of jobs. Easily attached or detached from auto by one man. See your Jackson distributor or write for complete description.



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Only the Allis-Chalmers Model D . . .

has Tandem Drive and other Big Grader features

The Model D is engineered from the ground up *as a motor grader* — with no compromises. It is streamlined and completely functional, without the objectionable features and handicaps of a converted machine.

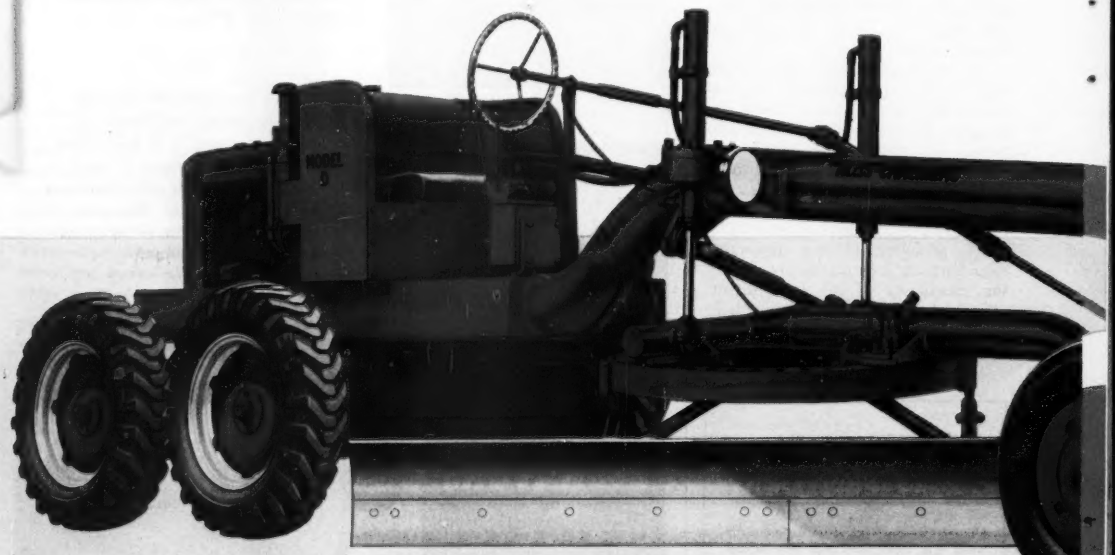
Tandem drive — with four ground-gripping contacts instead of two — gives the Model D greater driving power and stability, smoother blading. Its other BIG GRADER design and performance advantages include: shock-absorbing **Tubular Frame — ROLL-AWAY Moldboard** that *rolls* more material, faster and with less power — effort-saving **Hydraulic Controls — Engine Over Drive Wheels** for best traction — **More clearance** all the way — **Long Wheel Base** to give a smoother grade — **Simple Power Train** for best performance, easiest servicing — **Fully Visible Blade** for greater efficiency — Comfortable seat, "clean" platform, convenient controls.

ROLL-AWAY is an Allis-Chalmers trade-mark.

does so many jobs — so well

On both construction and maintenance, the Model D is an all-round, year-round machine. And with its big grader features, it does outstanding work on every job. The D's usefulness is further multiplied by these easily mounted, matched attachments: Rear-End Loader, Scarifier, Blade and V-Type Snowplows, Windrow Eliminator . . . All-View Cab, Heavy-Duty Front Tires, Other Special Accessories.

By performing a wide variety of jobs, the Model D releases larger graders for heavier work — effecting important economies. It operates economically, too — runs all day on a tank of gasoline. — And a price one-third that of large graders, makes the Model D the biggest value of all!



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Maintains roads and streets.
Windrow eliminator feathers out windrow.

Finishes between forms,
levels subgrade, landscapes.

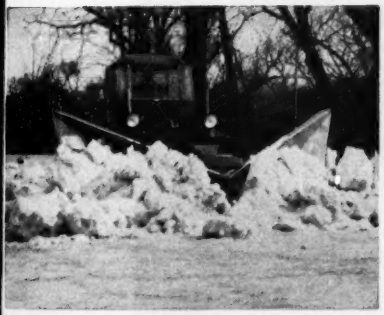
Handles light construction and
terracing, strips sod.

Cuts and cleans ditches, builds up shoulders,
slopes banks up to 2:1.

handles ALL jobs for some users

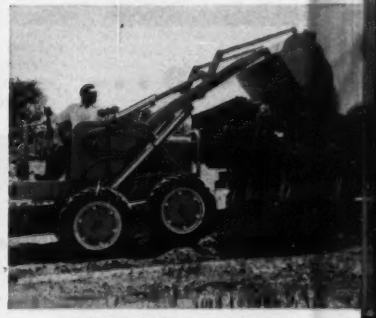
. . . SOME jobs for all users

Scarifies toughest surfaces,
mixes and spreads oil mix.

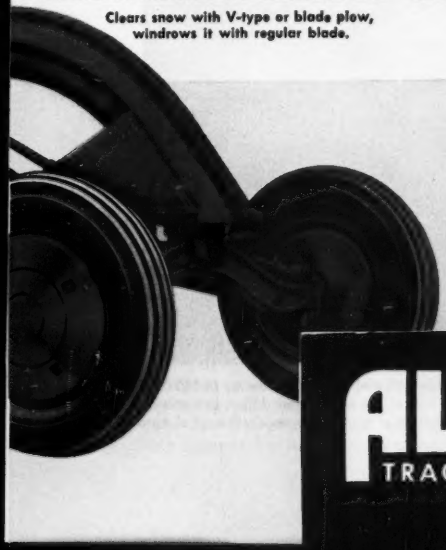


Clears snow with V-type or blade plow,
windrows it with regular blade.

Maintains access roads, park drives,
parking lots, playground areas.



Loads sand, snow, any material.
Cleans up debris.



WEIGHT — 8,500 lb. (bare)

BRAKE HP. — 34.7 (famous high-torque A-C gasoline engine)

SPEEDS — four forward, 2.40 to 18.61 mph.; reverse to 2.9.

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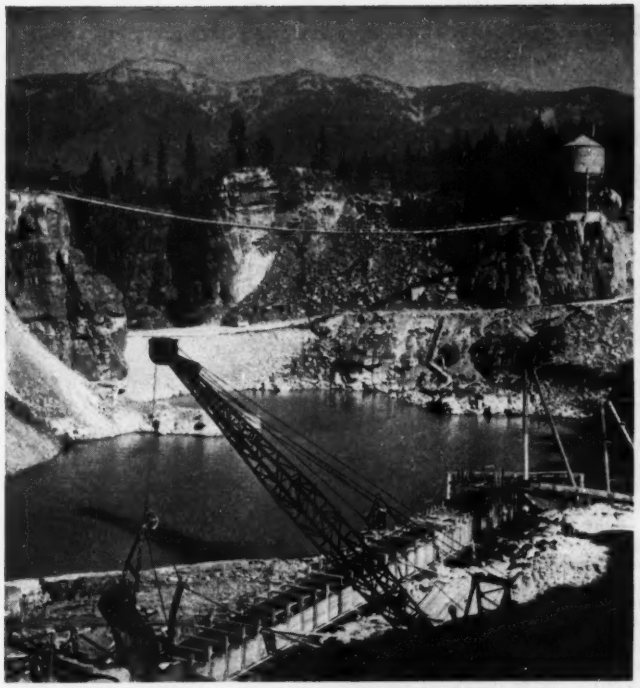
Single Blast Diverts Surging River

Before . . . Scene immediately upstream of the site for Cabinet Gorge Dam on the Clark Fork River in north Idaho shows swirling, deep stream which had to be diverted through twin 29-ft diversion tunnels (not shown). Swift current and water depths to 140 ft called for unusual methods in placing the massive cofferdam required to block the torrent of water around a "Z" bend in the river.

After . . . Dust is settling over the area after 60,000 cu yd of rock have been blasted into the stream by 65,000 lb of dynamite sealed in coyote holes that honeycombed the 200-ft cliff of the gorge after drillers and powder experts had completed their job. Blast accomplished in seconds what might have required days of hard work to divert the surging stream.



COMPLETED DIVERSION COFFERDAM appears in background. Main cofferdam was placed later farther upstream in then still water. Third one (downstream) appears in foreground to triple-seal river bed for concrete dam foundation below. Wooden sluiceway carries water from pumps dewatering hole.

MORRISON-KNUDSEN CONSTRUCTION MEN chose a spectacular way recently to divert the turbulent Clark Fork River in the narrow Cabinet Gorge in north Idaho for construction of Cabinet Gorge Dam for the Washington Water Power Co.

One giant blast by 65,000 lb of dynamite shoved 60,000 cu yd of rock outward from a sheer 200-ft cliff and dropped the mass across the river to halt its flow instantly. The massive cofferdam diverted the stream through twin 29-ft diversion tunnels and created still water so that an upstream main cofferdam could be constructed without difficulty to further block the river which formerly churned through the narrow gorge in depths varying from 70 to 140 ft. After a downstream main cofferdam was placed, pumping operations were begun. Even with this triple seal some difficulty was experienced in dewatering the site.

Water was pumped from the cofferdam at the rate of 55,000 gpm for 2 weeks without making any appreciable headway. A sheet-pile cutoff on the downstream cofferdam also had little or no effect. As this was written, more pumps were being installed to boost the capacity to 130,000 gpm. The engineers and contractors believe that this will do the trick. Seepage is thought to come through cracks deep below the cofferdams with a minimum of water coming through the earth-and-rockfill dams.

Cabinet Gorge Dam is a hydro-electric development scheduled to produce 200,000 kw by the fall of 1952. The dam will be concrete, arch-type, curving in a 600-ft bow across the river and rising 192 ft above bedrock.

Unlike gravity-type concrete dams that block streams by sheer mass and weight, this one will hold back the impounded water by the thrust its arch exerts into rock abutments. The dam will contain 82,000 cu yd of concrete.

B. "Woody" Williams is project director for Morrison-Knudsen Co., Inc., on construction of the Cabinet Gorge project. Engineering is done by Ebasco Services Inc., representing the power company.

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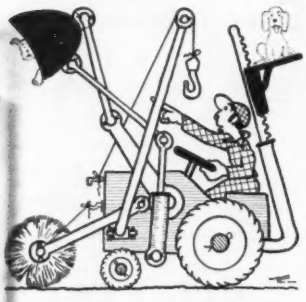
Front-End Loader: Contractor's "Handy Man"

By HOMER C. CAMPBELL, Service Manager, H. W. Moore Equipment Co.

THE UBIQUITOUS FRONT-END LOADER has become an indispensable item in the contractor's list of utility equipment; and there is an almost endless variety of makes and models on the market.

Although there seems to be no complete history of this type of



materials handling equipment, the author recalls that early models were nearly all attachments for modified wheel- and crawler-type tractors. Some were controlled hydraulically, some cable-operated and other mechanical means were employed to get materials from here to there.

This type of equipment came into its own after World War II. Leading manufacturers had found that building an attachment for a converted tractor was not entirely satisfactory. They, therefore, started to build the loader as a self-contained unit, tractor, shovel and all into one compact machine—with transmission speeds, both forward and reverse, to suit the demands of the average user.

Special attention was given to proper balance as is essential in this type of equipment. Since the unit is so versatile, thought was necessary in the design to retain many features that are not pertinent to the loading function. Most loaders can be used as a crane, a fork lift and bulldozer in addition to many drawbar operations such as pulling rubber-tired rollers, sweepers and oiling equipment.

The rubber-tired type of machine is, in most cases, readily trailed behind a truck—which adds to its versatility. One-man operation can be had on many jobs. The operator can trail the unit to the stock-pile or other source of material, load his truck and continue until the job is completed; then move on to the next location.

It is an excellent piece of equipment for the small operator and indispensable to the large contractor. Many state highway departments have several on each maintenance division. It has become as much of a necessity in the equipment line as the tractor and dozer, the truck- or crawler-mounted shovel and dragline, the motor truck, high-speed scrapers, and the many other pieces of equipment without which we could not operate under today's pressure.

Like all construction equipment, a loader has its limitations. In many cases, it is abused about as much as it is used. Most loader manufacturers try to make these machines "self-loading" as nearly as possible, particularly those machines employing the use of dual controls on the bucket. They have one control for raising and lowering the bucket assembly and the other for dumping and controlling the lip angle of the bucket.

Too many operators are under the false impression that it is necessary to back up and take a run at the stock-pile to get a load. With a dual-control bucket machine, and on some machines without the dual control, it is possible to move into the stock-pile and, along with the forward movement of the machine, to manipulate the bucket in such a way as to get a full load without abusing the loader.

The operator who persists in "rarin" into the stock-pile does not get a bigger load or work faster than the sensible operator. But in the long run he has lost many tons of material moved because his loader is down for repairs and service far too much of the potential work time of the machine.

Watch one of these driver-cowboys hit a stock-pile sometime: the front end squats down like a setting hen and the rear end goes up in the air like a sun-fishing bronc. Then the rear end drops and the front end comes up. Shock loads are produced far beyond the designed strength required in proper loading. The same is true for crawler-type tractors that mount shovels. Machine gyrations are different; nevertheless, shock loads are proportional and the damage eventually is just as great and down-time just as costly.

Front-end loaders, as a whole, are serviced easily, and a few min-

utes a day given to preventive maintenance will pay off well in tons of materials moved. This equipment generally operates under adverse conditions. It has to cope with dust and dirt; therefore, service it accordingly.

New Brick Matches Old

THE 32-STORY Chrysler Building East, being built more than 20 years after the adjacent 77-story Chrysler Building in New York, will present an exterior identical to that of its famous neighbor.

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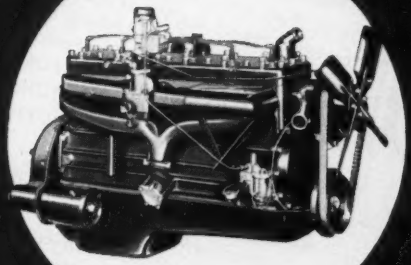

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12. Bucket, Dipper Sizes and Hourly Capacity

By E. O. MARTINSON, Vice-President, Engineering, Koehring Co.

This article, the 12th consecutive one in a series on the fundamental principles of earthmoving, is sponsored by the Power Crane and Shovel Association. It is a continuation of article 11, "How to Choose the Proper Size Excavator."

• **Dragline bucket capacity**—Dragline bucket size usually is larger than the shovel dipper size. The manufacturer's lifting capacity table must be used to determine bucket size. Weight of the bucket and the weight of material, together with length of boom, determine the size of bucket that can be used. Lightweight buckets permit larger loads but will not stand the abuse and abrasion absorbed by heavier types.

Weight of the bucket and load usually should not exceed 67% of the tipping load of the machine, whereas the lift crane capacity is based on 75% of actual tipping. Under favorable conditions, where there is solid footing and no suction on lifting of the bucket, draglines and clamshell loads may approach 75% of the tipping load.

The useful dragline bucket lifting capacity is shown in Fig. 4 (Nov. issue, p. 79). The broken line

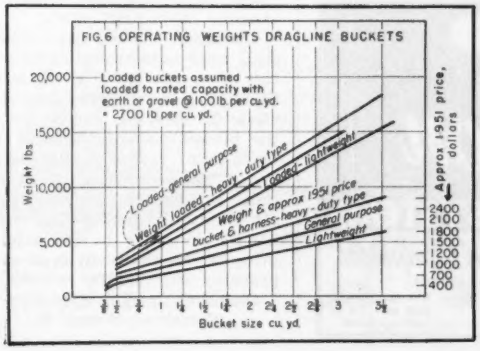
FIG. 6 OPERATING WEIGHTS DRAGLINE BUCKETS
Loaded buckets assumed loaded to rated capacity with earth or gravel @ 100 lb per cu. yd. = 2,700 lb per cu. yd.
Weight lbs
Approx 1951 price, dollars
Loaded-general purpose
Loaded-heavy-duty type
Loaded-lightweight
Weight & approx 1951 price bucket & harness-heavy-duty type
General purpose
Lightweight
Bucket size cu. yd.

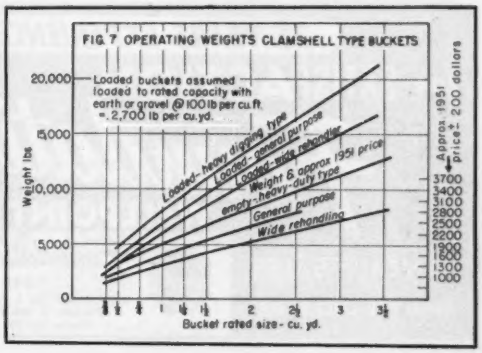
FIG. 7 OPERATING WEIGHTS CLAMSHELL TYPE BUCKETS
Loaded buckets assumed loaded to rated capacity with earth or gravel @ 100 lb per cu. ft. = 2,700 lb per cu. yd.
Weight lbs
Approx 1951 price-200 dollars
Loaded-heavy digging type
Loaded-general purpose
Loaded-wide rehandling
Weight & approx 1951 price empty-heavy-duty type
General purpose
Wide rehandling
Bucket rated size-cu. yd.

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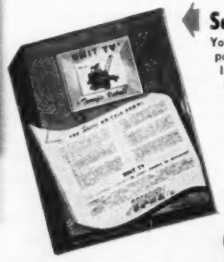

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shows the 67% of tipping capacity for tough going. A 2½-yd excavator, for example, should not use a dragline bucket weighing more than 16,000 lb loaded which happens to occur at a radius of 60 ft, or less. But if the operating radius must be 70 ft, the total weight must not exceed 12,000 or 13,000 lb.

The chart on operating weights for dragline buckets (Fig. 6) shows that a 3½-cu yd, lightweight dragbucket weighs 14,300 lb loaded. This could be used to a radius of 60 ft at 67% of tipping or 65 ft at 75% of tipping—referring again to lifting capacity in Fig. 4.

The crane range diagram (Fig. 5 Nov. issue, p. 80) shows that this 14,300-lb bucket, operating at 65-ft radius, requires a boom 70 ft long at about a 30-deg angle, giving a boom-point height of 41 ft. The maximum recommended reach of 78 ft shown in Fig. 4 can be attained by an 80-ft boom at a low angle of 25 deg for a 38-ft height, or a 100-ft boom elevated to 42 deg, giving a height of 71 ft.

But the lift chart in Fig. 4 shows a 75% capacity of 11,000 lb at 78-ft radius and the dragline bucket chart in Fig 6 shows that a 2½-cu yd lightweight bucket or a 2-cu yd heavy-duty type would meet this weight limitation.

Maximum drag cable pull at full rated engine power is slightly greater than the hoist line pull because the drag drum is smaller in diameter than the hoist drum. These values of hoist cable pull also are shown in Fig. 4 by the intersection of the cable pull curve with the capacity curve.

Again it must be emphasized that the manufacturer's lifting capacity tables for a particular crane should be consulted to determine actual bucket sizes which that machine can handle. The charts shown here are only typical and are for machines equipped to give maximum dragline lifting capacities.

• **Clamshell bucket size** — Clamshell sizes normally are based on the same rating, 67% of actual tipping, as the dragline bucket to allow for heaping, suction or for the bucket swinging beyond the boom-point radius during swing. Fig. 7 shows weights of various types and sizes of clamshell buckets, empty and loaded. The right-hand scale shows the approximate price of the clamshell buckets to probably within $200 to $300.

Clamshell bucket sizes may be

(Continued on page 70)

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FROM RAW MATERIALS TO POURED CONCRETE

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- Three 7 cu. yd. bins and 2 cu. yd. skip store up to 23 cu. yds. of aggregate.
- Charging skip hydraulically operated.
- Bin selector located by skip control directs skip.
- Equipped with either dial or beam scales.
- Weight, 17,800 lbs; height, 12 ft.; width, 8 ft.; overall length, 28 ft. (with skip down).
- Mounted all around on 8.25x20 tires.

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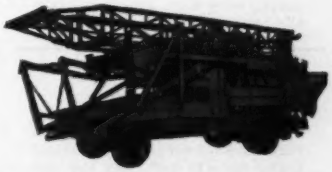

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ATTACHMENTS INCLUDE: Scoop buckets in various sizes, swivel and standard type concrete hoppers in ¾ cu. yd. capacities, lift forks, crane boom, track extensions with braces up to 26 feet overall.

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EARTHMOVING . . . Continued from page 68

selected by methods similar to those used for dragline buckets. Slightly higher maximum weights may be recommended for clamshell buckets, as shown by the clamshell range in Fig. 4. This is because clams are lifted straight up but in dragline bucket operations, the drag cable pull opposes the hoist cable to a certain extent to hold the drag bucket level and this decreases the net pull available for lifting a drag bucket.

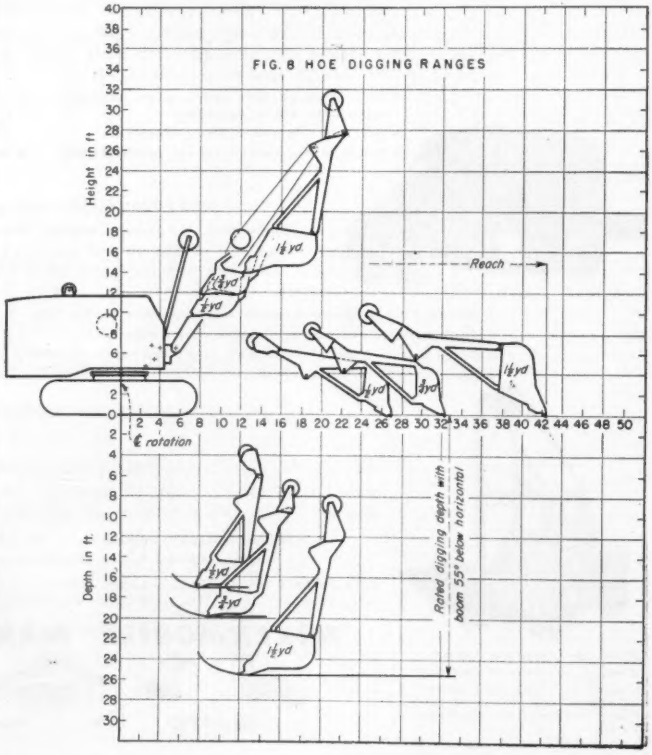
Referring to the same 2½-yd excavator as used in the dragline example, an 18,000-lb maximum lift may be used on clamshell operations. This occurs at a 52-ft radius, or less. Fig. 7 shows that on rehandling of loose materials, such as gravel requiring the rehandling type of clamshell, a 4-cu yd clamshell bucket could be handled. This size bucket might require 20 ft of space from boom point, and, if the stockpile is 50 ft high—for a total of 70 ft—the range diagram in Fig. 5 will show the necessity for an 80-ft boom at about a 55-deg angle for the 52-ft radius selected above.

In this case, any radius less than 55 ft would not increase the allowable clamshell bucket size, because 18,000 lb is the maximum recommended load for a 2½-cu yd excavator on clamshell operation, as shown on the lifting capacity chart in Fig. 4. The limiting clamshell load for a 1½-yd crane is about 12,000 lb, according to the chart, and the machine would handle it at a radius of 40 ft, or less.

• **Hoes**—Hoe dipper sizes may be selected principally on the basis of desired cutting width, but the hoe dipper capacity can be slightly larger than the shovel dipper size. Since the loaded hoe dipper generally is carried in closer to the machine, the heavier load can be handled safely. A hoe digging cycle usually is slower than that of a shovel.

Fig. 8 shows the relative proportions of hoe attachments for three sizes of machines.

• **Hourly capacities**—Fig. 9 shows theoretical hourly capacities of shovels and draglines for various classes of material, for 90-deg swing and for the most favorable



digging depths. The user is cautioned to modify these theoretical capacities by factors based on his own experience of job efficiency, weather delays, maintenance, breakdowns, hauling delays, major moves, opening new cuts, blasting and similar delays.

Improper spotting of trucks requires longer swings and longer loading time. An insufficient number of trucks or bunching of trucks result in lost time. Careless operation and poor maintenance will increase the number of breakdowns and repairs. Bad weather may stop certain types of operation, but not others. Operator skill and incentives affect production. Ease of operation and time required for routine machine adjustments alter production figures. Excavator cable speeds and swing speeds have some effect on capacity.

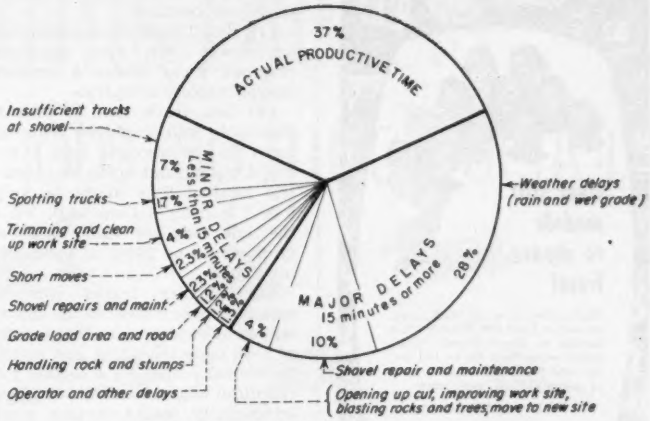


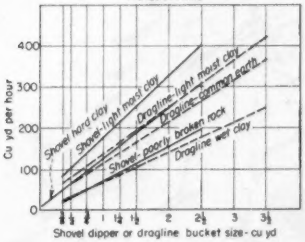
FIG. 10 POWER SHOVEL PRODUCTIVE TIME

Average of 16 power shovels on 10 highway jobs
Data from highway research board 1947-1949

Considerable Variance

Theoretical capacities of shovels and draglines are based on many studies by various manufacturers. There is considerable variance in theoretical capacity, depending on the type of material being excavated. The solid lines in Fig. 9 are theoretical, shovel capacities and the broken lines are dragline hourly capacities. For the same size of drag bucket as the shovel dipper size, the dragline hourly capacity is somewhat less than for a shovel. However, as indicated before, the drag bucket often may be larger than the shovel rating.

FIG. 9 THEORETICAL BANK YARDAGE FOR SHOVELS AND DRAGLINES, 90° SWING - BEST DIGGING DEPTH, NO LOST TIME



Theoretical capacities are at most favorable digging depths and 90-deg swing; capacities shown in Fig. 9 should be modified by the following factors:

Angle of Swing

Operation	60 deg	90 deg	120 deg	150 deg	180 deg
Shovels	1.16	1.00	.88	.79	.71
Draglines	1.11	1.00	.91	.83	.77

More complete tables of theoretical output and modifying factors are shown in Bulletins 3 and 4 of the Power Crane and Shovel Association, which are available from many construction machinery distributors at no charge. In spite of all these variables, the chart is useful in arriving at estimated output, especially so in comparing outputs of various size machines.

Fig. 10 shows an average of delays recorded on several highway jobs, as obtained by the Highway Research Board of the National Research Council. The figure of 37% net productive time is an average of several highway jobs. Hence, some jobs showed results below this figure. But these jobs were affected seriously by weather and hauling unit delays. Dragline operations on drainage work not requiring hauling units would not be so dependent on weather and show better operating ratios. Likewise, stone quarry operations would not be so sensitive to weather and other job variations.

This chart of delays shows what can happen to reduce theoretical output. Here is where the job estimator's judgment can make or break the contractor.

The delay chart also brings out the advantage of having good maintenance and repair facilities at the job site and perishable parts within quick access. Good management and planning of digging moves, truck spotting, truck spacing and layout of work roads also pay off in reducing some delays shown on the chart.

• **Size relationship of excavator and hauling unit**—There is a best size and type of truck or hauling unit for each excavating job. However, the job can be operated efficiently with quite a range of hauling equipment.

In general the large excavator requires large hauling units for several reasons:

(1) Large body size permits quick spotting of large shovel dippers or dragline buckets because of larger target.

(2) With large trucks, spotting under shovel is less frequent and fewer spots waste less shovel productive time.

(3) There is less waste of truck full-load capacity with large units. For example, a 2½-yd shovel loading a light truck, having a capacity of 3 or 4 cu yd could load only one full dipper into the truck because two dippers would overload.

Likewise a 6-yd unit would handle two loads of a 2½-yd dipper, wasting 1 yd of hauling capacity. But the 6-yd haul unit would handle four passes of a 1½-cu yd shovel nicely or eight passes of a ¾-yd shovel.

(4) Too many small units are difficult to synchronize with shovel operations.

On the other hand, small haul-

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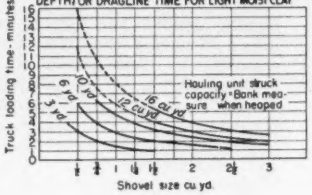
ing units are better suited to smaller shovels because:

(1) Small trucks are more maneuverable and can negotiate cramped areas where a smaller shovel is likely to operate.

(2) Less truck time is wasted. Nearly 16 min would be required for a ½-yd shovel to load a 16-cu yd wagon unit when its round-trip hauling time might be only 6 or 7 min for a 1-mi haul. Thus the idle time of costly hauling units would be 260% of the hauling time.

(3) Smaller trucks can be matched more closely to the shovel output. For example, three units of 6-yd capacity might just match the shovel output for a certain job condition where two units of 12-cu yd capacity would involve more waiting time. If the hauling distance is decreased, only two units of 6-yd capacity might be needed, but it would still be necessary to use two units if they were of the 12-yd size, wasting even more of the available productive truck time.

FIG. 11 TRUCK LOADING TIME (SHOVEL DIGGING HARD CLAY - NO DELAYS - 90° SWING-BEST DIGGING DEPTH) OR DRAGLINE TIME FOR LIGHT MOIST CLAY


Truck loading time - minutes
Hauling unit struck capacity - Bank measure when heaped
3 cu yd
6 cu yd
9 cu yd
12 cu yd
Shovel size cu yd.

A rule of thumb is to have the hauling unit at least four or five times the shovel dipper capacity. Fig. 11 shows loading time for all sizes of shovels loading several typical sizes of hauling units—assuming shovel digging rates, as shown in the capacity chart, Fig. 9.

SPIKE SEZ: Glory Be! 'Tis great to crawl into these fancy duds once a year and play Santa Claus. Wish I could put a tree like this into every construction man's home, loaded with models for the future construction stiffs of America, and with real big rigs for their daddies to carry on the job we've tackled to make our country strong. Anyway, Merry Christmas to every one wherever you are, and a Happy New Year full of successful jobs!

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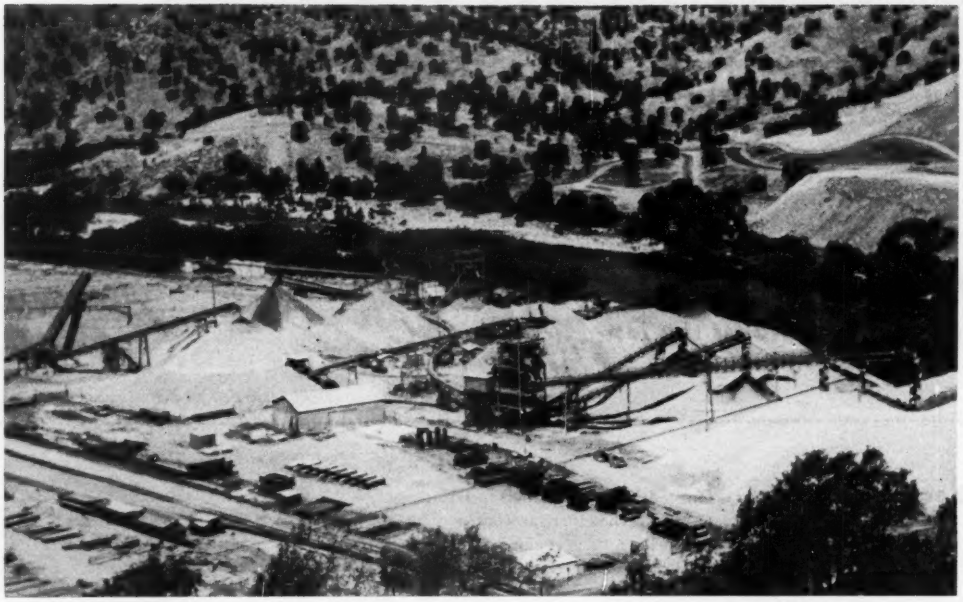
PINE FLAT DAM... Valley Railroad and



AGGREGATE PLANT is laid out on river bank about ½ mi below the dam. Aggregate from raw-screening plant, divided into sand and gravel, is brought in at the left on rail cars. Sand and rock are switched to their respective sections for washing and screening. Gravel plant is in right foreground and sand classifying plant is in background.

Part III—Aggregate Production

By L. L. WISE, Associate Editor

SEVEN-CAR TRAINLOAD of sand pulled by a 44-ton G-E locomotive follows river-level route upstream from quarry to finish aggregate plant just below the damsite. Rail haul was adopted after thorough consideration of truck and conveyor belt operations.

AGGREGATE for Pine Flat Dam is produced from a riverside quarry located some 6 mi below the damsite. The aggregate is taken through the following steps: (1) excavated by electric shovel; (2) loaded into rail cars; (3) hauled over a figure-8 track to a raw-screening plant; (4) raw-screened (material more than 7 in. dia scalped out and other material divided into sand and gravel); (5) rail-hauled to finish aggregate plant located about ½ mi below the dam; (6) processed in either the aggregate or sand plant; (7) hauled by conveyor belt to the batch plant; and (8) rescreened just prior to discharge into the batch plant bins.

The quarry is relatively level and excavation is by a Bucyrus-Erie 120B shovel equipped with a

---

• This is the third and concluding part on the construction plant setup at Pine Flat Dam on the Kings River in California. Parts I and II, in the October and November issues of CM&E, discuss an unusual cableway and aggregate and batch cooling.

Conveyors Haul Aggregate Six Miles

RAW AGGREGATE is brought from quarry to raw-screening plant by side-dump rail cars. Material goes through grizzly, then is hoisted by conveyor belt to top of plant.

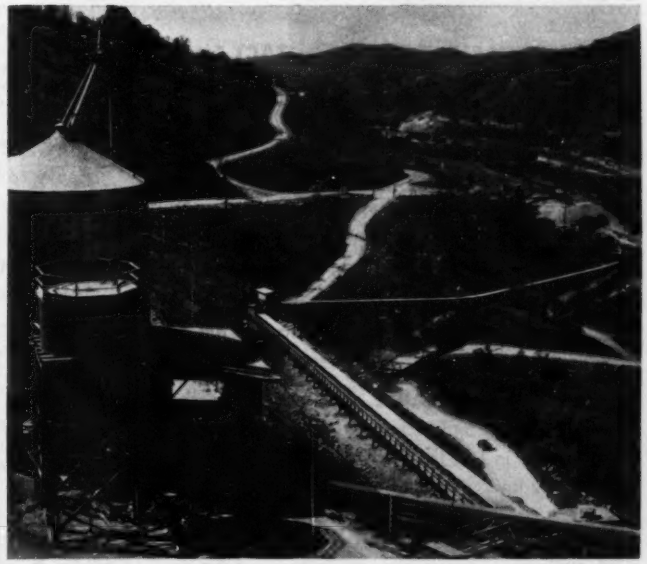
RAW-SCREENED AGGREGATE is loaded on cars by conveyor for transfer to main plant for final processing. Initial classifying removes material larger than 7 in., separates rock and sand.

5-yd Esco bucket. This raw aggregate is loaded into Western rail cars of 30-cu yd capacity each, hauled by 44-ton General Electric locomotives.

The initial classifying plant removes all material more than 7 in. in size. The raw-screening plant also classifies material into sand and rock (¼ to 7 in.). From the screening plant the material is belt-conveyed to surge piles by Conveyco conveyors. In fact, all conveyor systems used at Pine Flat were designed and made by the Conveyor Co. Haul to the main aggregate plant is by rail.

At the main plant, the 30-cu yd Magor cars side-dump into a 250-ton hopper that takes an entire trainload of seven cars. From the hopper it is conveyed to a transfer station where sand and rock are switched to proper parts of the system. Rock is taken to a gravel surge pile and from there to the screening plant. Here it is processed by Allis-Chalmers screens and cleansed by a scrubber made by Willamette Iron & Steel Co.

(Continued on page 78)



CONVEYOR BELT brings material from main aggregate plant in the background up steep slope to batching facilities. Conveyor is roofed over to minimize heating of aggregate. Silos at left store cement.

Before you buy any Mixer check KWIK-MIX

16-S DANDIE® *advantages*

✓ **ADJUSTABLE, DOUBLE-CONTACT SHAKER** on skip, with contact at each end of skip frame, has vertical shaking action. No twisting strain.

✓ **AUTOMATIC WATER SYSTEM,** accurate to fraction of a pint, combined with exclusive blade-and-bucket re-mixing action, produce consistent quality concrete every batch.

✓ **8-SECOND DISCHARGE** . . . tilted Flow-Line Discharge Chute, available only with Kwik-Mix, reaches deep into drum, discharges full batch in 2½ revolutions, saves seconds every batch.

✓ **INTERCHANGEABLE** side or end discharge . . . mixer can be changed from side to end discharge in less than an hour, because axles are easily interchangeable on square frame.

MOTO-BUG® . . . labor-saving power wheelbarrow takes all heavy manual work out of hauling, backing up, spotting, has full power forward and reverse . . . no push, no pull necessary. 10 cu. ft. hopper converts to 1500-lb. flatbed, fork lift, scraper blade.

✓ **3-POINT SUSPENSION MOUNTING** on heavy coil springs (2 at each corner of rear, and 1 double-coil arrangement centered at front) absorb high-speed operating and travel shocks.

✓ **HEAVY CAST-STEEL DRUM HEADS** with machined roller paths . . . independent engine clutch . . . multiple V-belt drive . . . Tower Loader for overhead discharge . . . special 90" skip, are other 16-S features worth checking.

Before you buy any mixer, get all the facts from your Kwik-Mix distributor on this big-production 16-S Dandie. Other sizes: 11-S, 6-S, 3½-S . . . also, bituminous, tilting and non-tilt plaster-mortar mixers, and Moto-Bug.

To: KWIK-MIX Co., Port Washington, Wis. Send new catalog on 16-S Dandie, also:
NAME
COMPANY
STREET
CITY, STATE
☐ 11-S ☐ 6-S ☐ 3½-S
☐ 10 ☐ 14 ft. bituminous
☐ 6 ☐ 10 ft. plaster-mortar
☐ Tower Loader ☐ Moto-Bug

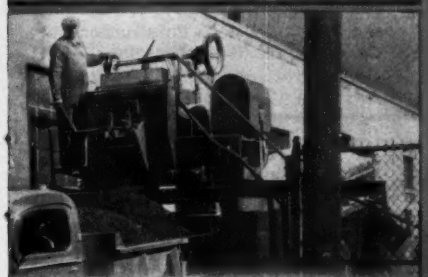
KOEHRING PRODUCT

CKM240

KWIK-MIX COMPANY • Port Washington, Wis.
(Wisconsin Subsidiary)

3½-S DANDIE with side or end discharge, tilt or non-tilt drum, is sturdy, light, portable for high quality, on-the-spot mixing.

2-WHEEL 11-S end-discharge, non-tilter, is also available on 4 wheels, side or end discharge for thorough Dandie-mixed concrete.



KWIK-MIX BITUMINOUS mixers . . . 10 and 14 cu. ft., are readily adaptable as stationary plants or as highly mobile 4-wheel units.

FOR DISCHARGE AT 9'-2" HEIGHT . . . Kwik-Mix Tower Loader fits 11-S and 16-S mixers . . . is also available for bituminous mixers. Loads into trucks, forms, overhead hoppers, or handles stockpiling. Collapses for travel.

17-FT.-DEEP Parsons 310 Trenchliner*

With 45 digging feeds, this big-capacity 310 Trenchliner produces from 8" to 15½' of clean, smooth-walled trench per minute . . . digs 1½ to 4½' wide at 17' depth with single boom, and up to 6' wide at 11' depth with dual booms. 310 has full reverse of all operations for undercutting or making vertical set-ins . . . is equipped with easy-in, easy-out "Tap-In" teeth. Parsons line also includes 4 Trenchliners in smaller sizes.

PARSONS (Koehring Subsidiary)
Newton, Iowa

EASY-CHARGING Johnson Lo-Bin Batcher*

Lo-Bin Trolley Batcher holds 8, 20 or 30 tons . . . is only 7½' to 9½' high for charging with front-end tractor loader. Lo-Bin has 2, 3 or 4 compartments, up to 4 weigh beams, 22 or 44 cu. ft. weigh hopper . . . or can be arranged for 2 or 3 aggregates and 1 bulk cement compartment. Efficiently serves 28-S, 16-S, 11-S, 6-S mixers. Lo-Bin is quickly dismantled, easily moved by dump truck. Optional: wheels, tires, tow-bar.

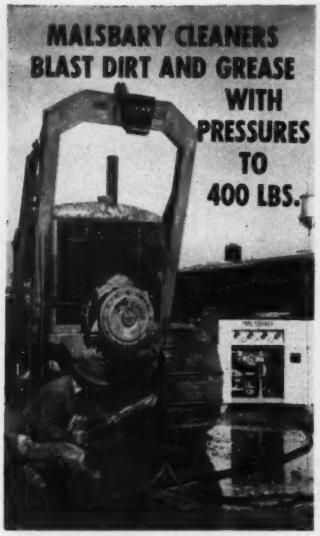
C. S. JOHNSON (Koehring Subsidiary)
Champaign, Illinois

HIGH-DISCHARGE Koehring 16-E *twinbatch**

Here's a portable mix plant with controlled elevated discharge for all types of concrete construction. Boom on Koehring 16-E elevates 60°, swings in 160° arc. Bucket discharges controlled batch up to 21' (higher with special boom). 16-E produces up to 50 cu. yds. per hour, exceeding larger 27-E single-drum paver. Drives 6 m.p.h. on rubber tires job to job. Also check big Koehring 34-E *twinbatch* for major paving.

KOEHRING COMPANY
Milwaukee 16, Wis.

X67



Prevent corrosion and abrasion . . . uncover wear before it causes damage and costly downtime . . . by cleaning regularly with MALSBARY Heavy-duty Cleaners. Clean equipment is easier to repair, too—saves up to 40% of mechanics' time. MALSBARY patented pumping system delivers plenty of hot solution at 250-400 lbs. pressure, cleans big tractors in 2 hours or less (conventional steam cleaners require 4 to 8 hours).

ONLY MALSBARY GIVES YOU ALL 5 QUICK-CLEANING ACTIONS

1. HIGH PRESSURE STEAM CLEANING.
2. HIGH PRESSURE HOT WATER.
3. HIGH PRESSURE COLD WATER.
4. LOW PRESSURE WET STEAM.
5. LOW PRESSURE WARM WATER.

See for yourself how MALSBARY cuts cleaning time and helps reduce repair costs and downtime. Mail coupon TODAY for on-the-job demonstration. 21

MALSBARY MANUFACTURING CO.
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Room 212, 845 92nd Ave., Oakland 3, Calif.

I AM INTERESTED IN

☐ Free Booklets on MALSBARY Cleaners
☐ On-the-job Demonstration
☐ Names of Nearby MALSBARY Users

Name _____ Position _____

Business _____

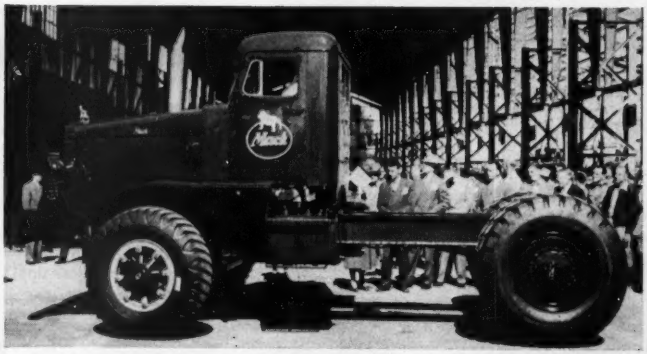
Address _____

END OF THE TRAIL for aggregate is at the top of the rescreen tower at the batch plant high above the river. Final screening classifies material to take into account breakage in transit. Conveyor belts transport aggregate for ½ mi from main plant to batch plant bins.

Sand goes from a radial storage pile to the classifying plant. Here it is cleaned and can be recombined according to the job specifications. Sand plant segregation is accomplished by Allis-Chalmers screens and Dorr classifiers.

Contractor for Pine Flat Dam is Pine Flat Contractors, a joint venture with Guy F. Atkinson Company as sponsoring firm. Other participating firms in the $24-million contract are Bressi & Bevanda Constructors, Inc., Charles L. Harvey, Inc., J. A. Jones Construction Co. and A. Teichert & Sons, Inc.

Off-Highway Mack From the West



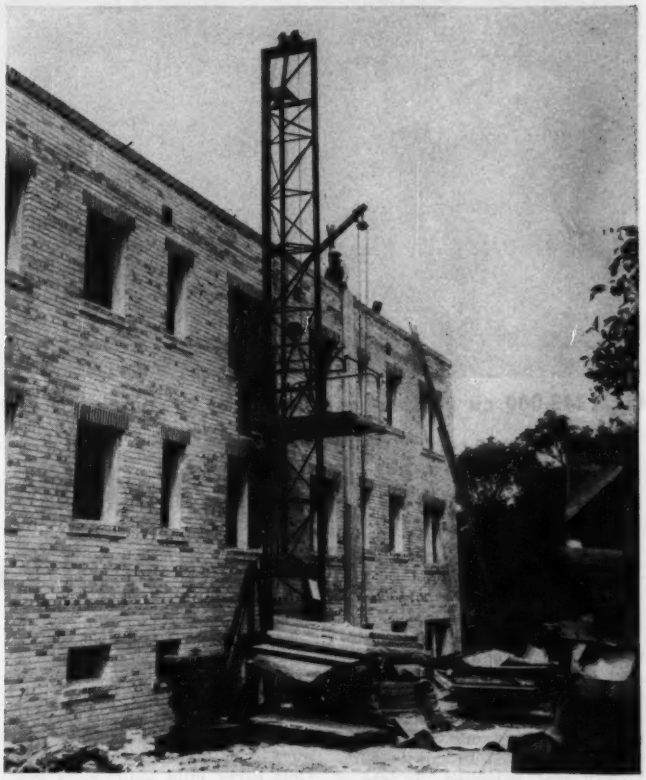
THE FIRST Mack off-highway truck to be assembled on the West Coast rolled off the line at the Wooldridge Manufacturing Co. at Sunnyvale, Calif., recently. Four Mack models—ranging in sizes from 400-hp and 33-ton load capacity down to 200-hp, 15-ton load—will be assembled at Sunnyvale under a 5-yr contract signed by Mack Trucks, Inc., New York, and the makers of the Terra Cobra earthmover. The "pioneer", shown above, is a 15-tonner. Wooldridge presently is assembling 10 Mack trucks monthly and has commitments for 110. With the completion of a new building under construction exclusively for Mack assembly operations, one truck daily is possible. Wooldridge has exclusive distribution rights for ten western states under the contract.

Erection time: 3 hrs.

AN ORDINARY truck arrives at your job site hauling an American Portable Material Elevator. A small crew goes into action, and in about *3 hours* the elevator is up and working.

No more cumbersome, expensive wooden scaffolding. Yet the American PME gives you lifting heights from 40′ to 90′ by addition of 10′ tower sections. Capacity 2,500 lbs. Extras include self-dumping concrete bucket, swing boom, automatic safety device and transport wheels.

You can rent or buy this elevator. See your American Hoist distributor today.



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American Hoist & Derrick Co.
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AMERICAN PORTABLE MATERIAL ELEVATOR

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COMPANY_____

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CITY_____ STATE_____

Big (343,000 cu yd), deep (70 ft) cut is completed in three months when...

Wellpoints Work Wonders For AEC Power Plant Excavation

By JOHN C. RALEIGH
Chief Engineer
John W. Stang Corporation

"SURE IT'S IMPOSSIBLE," declared L. A. McCants, project manager for Ebasco Services, "but we have to begin pouring concrete on May 25th." With this statement, in mid-February, one of the most determined races in construction history was launched. It was a race against time by round-the-clock wellpoint unwatering paced by tractor-scraper excavation for the new $73,000,000 Joppa Electric Station on the Ohio River at Joppa, 6 mi west of Metropolis, Ill.

Roughly 343,000 cu yd of dirt were moved in excavating for the main building, a 144x600-ft structure. Original grade was El 350; lowest subgrade was to be 70 ft down, at El 280.

Excavation for the main building began on February 15, at a time when heavy rainfall was almost a daily occurrence and the Ohio River, only 300 ft away, was overrunning its banks. Its pool level fluctuated near El 325.

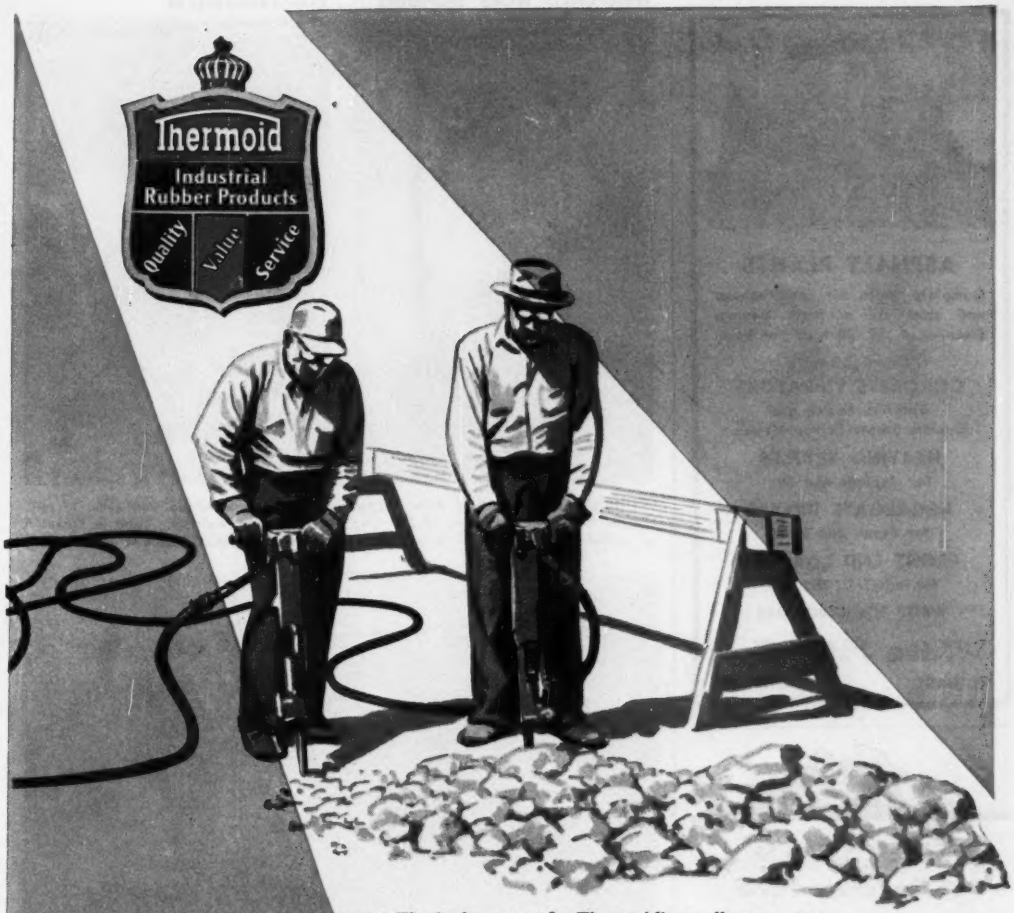
Material at the site was a very tight till formation. It was removed by tractor-drawn scrapers and by a dragline loading into wagons; spoil being hauled out over end-ramps at right angles to the cut's longitudinal north-south centerline. Sides of the cut stood on a slope of ¾ to 1.

The till was excavated 38 ft to El 312, at which point a 9-ft artesian hydrostatic head presented a problem. A 6-in. line of wellpoint header manifold was therefore installed at this stage of the cut (El 312) along the east, or upstream, side of the building. Extending toward the west side at the same elevation, 6-in. headers were installed on arcs to unwater the cut-off walls; one at the north end of the building and the other at the south, or riverside, end.

These lines overlapped, for a distance of 150 ft, the haul road ramps leading down to the main building excavation. Pumping on the systems reduced the artesian head sufficiently so that a main 6-in. line of wellpoint header manifold could be installed a little lower down, at El 308.

After these were in operation

(Continued on page 82)



Hose built for the job! That's the reason for Thermoid's excellent reputation among users of hose.

Our customers know they can rely on Thermoid's recommendations for their requirements . . . whether it's for air, water, suction, sand and concrete discharge, dredging sleeves, jetting hose—or any of the many other types of Thermoid hose built for the mining and construction industries.

And men who buy these quality products like the service they get from Thermoid's experienced distributors and sales representatives—and their intimate knowledge of the *buyer's* problems.

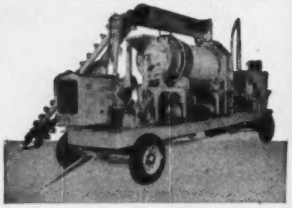
Get the hose built for *your* job. Specify Thermoid.

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



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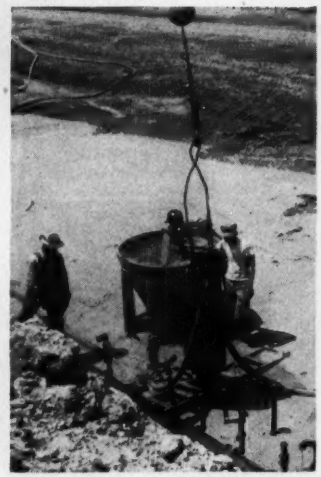
STEEL SYSTEM of Concrete Form Speed Construction

SAVINGS of 1/3 to 1/2 and over 500 uses are reported by contractors everywhere. All steel SPEED forms can be set up, stripped, cleaned, moved and reused in far less time than wood. Interchangeable on job after job, year after year—walls, slabs, circular tanks, manholes, tunnels, etc. For complete facts write Dept. MC.

IRVINGTON FORM & TANK CORP.
20 Vesey Street, N. Y., N. Y.

WELLPOINTS WORK WONDERS . . . Continued from page 80

TRUCK-MOUNTED AUGER drills through clay to facilitate installation of first ring of wellpoints, while header is assembled.



HEAVY JET, weighted with collar of rails, cuts hole for wellpoint. Sand in bucket is to backfill around wellpoint after jetting.

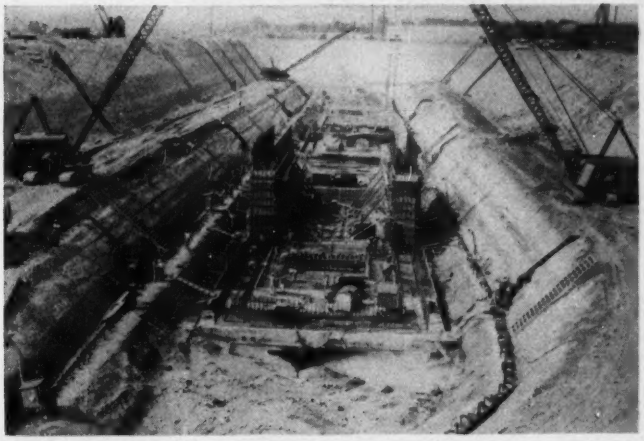
SCRAPERS AND DRAGLINE continue excavating as second ring of wellpoints is installed to lower ground water an additional 20 ft. Access ramp to floor of cut, now 55 ft deep and with 15 ft more to go, runs off to left at rear. There's similar ramp at near end.

for a short time, ground water was lowered to El 295—in effect, 26 ft. A sand and gravel stratum that extended well below subgrade was encountered at El 300, so a lower stage of wellpoint system was installed at El 295.

As the ground water level was lowered, continuous excavation operation followed it down, carrying 1:1 side slopes from El 312 to subgrade, 32 ft below. This was accomplished by starting to pump on each section of the wellpoint system immediately after it was installed. As sufficient header was laid and wellpoints installed to utilize a pump, that pump was put into operation at once. The valving arrangement allowed any 100- to 150-ft section of header to be cut in or out of operation at any time.

With jet pumps providing 400 gpm at 150-psi pressure in each instance, four crews installed wellpoints simultaneously on a round-the-clock schedule. Wellpoints were spaced at 3-ft centers on the upper stage and 2-ft centers on the bottom stage. Fourteen 8-in. wellpoint pumps were used in the unwatering operation.

BOTTOM OF CUT (at El 280) is bone dry despite high water (at El 325) in Ohio River only 300 ft away. Here, dragline excavates for turbine sump, while other units are readied and poured. Terrace at El 312 serves as access road for transit-mix truck.



THE PAYOFF—Turbine bay foundation rises in cut 70 ft deep with ¾ to 1 and 1 to 1 side slopes, excavated through 50 ft of tight till and 20 ft of sand and gravel. Two rings of wellpoints on 2- and 3-ft centers, with fourteen 8-in. pumps, keep cut dry.

Thus the race was won. Standing on the banks on May 27 and watching the first pour of concrete being finished in the bottom of the excavation at El 280, 70 ft below, was a group of vitally interested men—all wearing happy grins for a job well done. In the party were: Mr. McCants; Doc Arnold, general superintendent for Samuel Kraus Co., St. Louis, excavating contractor on the project; John Stang, president of the wellpoint firm; Bill Reiff, Stang project supervisor; and R. T. Case, Stang area representative.

The Joppa Steam Electric Station is being built by Ebasco Services Inc. for Electric Energy Inc., which includes the Illinois Power Co., Union Electric Co. of Missouri, Central Illinois Public Service Corp., Kentucky Utilities Co. and Midwest Utilities. E. K. Wilkins is construction manager out of Ebasco Services' New York office and Joseph F. Hughes is construction superintendent. E. H. Morgan is construction engineer and Thomas Demers is resident engineer, both of them with Ebasco Services.

Contractor H. H. Auch Reports...

● "We are happy to report . . . that the David White Universal Level Transit has our wholehearted approval."

GEO. W. AUCH COMPANY
BUILDERS

Mr. E. G. Locke, Sales Manager,
David White Company,
315 W. Court Street,
Milwaukee 12, Wisconsin.

Dear Mr. Locke:

It is with pleasure that I write you regarding the performance of our new David White Universal Level Transit, Serial #58114.

The ease and speed with which it is set up and the accuracy of the readings taken most certainly belie its actual cost. The level has been on our largest job since it arrived and the Superintendent of the job prefers to use this David White in preference to a . . . which requires much more "set up" time; and hence, for the ordinary shots is not near as popular on the job. We are happy to report to you that this David White Universal Transit Level has our wholehearted approval.

Very truly yours,
GEO. W. AUCH COMPANY
H.H. Auch

Here's why you'll like a DAVID WHITE UNIVERSAL LEVEL TRANSIT too . . . The David White "Universal" Level Transit is the most practical, complete builder's instrument on the market. Now available in a new improved model—complete with internal focusing, coated optics—guarded vertical arc — in fact every feature to assure you lifetime durability and accuracy. Write for name of our nearest dealer.

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Price $185.00* complete with tripod

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GULF PRODUCTS *and* FINE SERVICE

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on Donaldson Air Base Project

Dickerson, Inc., Monroe, North Carolina, has the contract for the construction of extensions and modifications of NE-SW runways at the Donaldson Air Base at Greenville, South Carolina. The project involves the excavation of 1,165,000 cubic yards of earth and 200,000 square yards of concrete paving.

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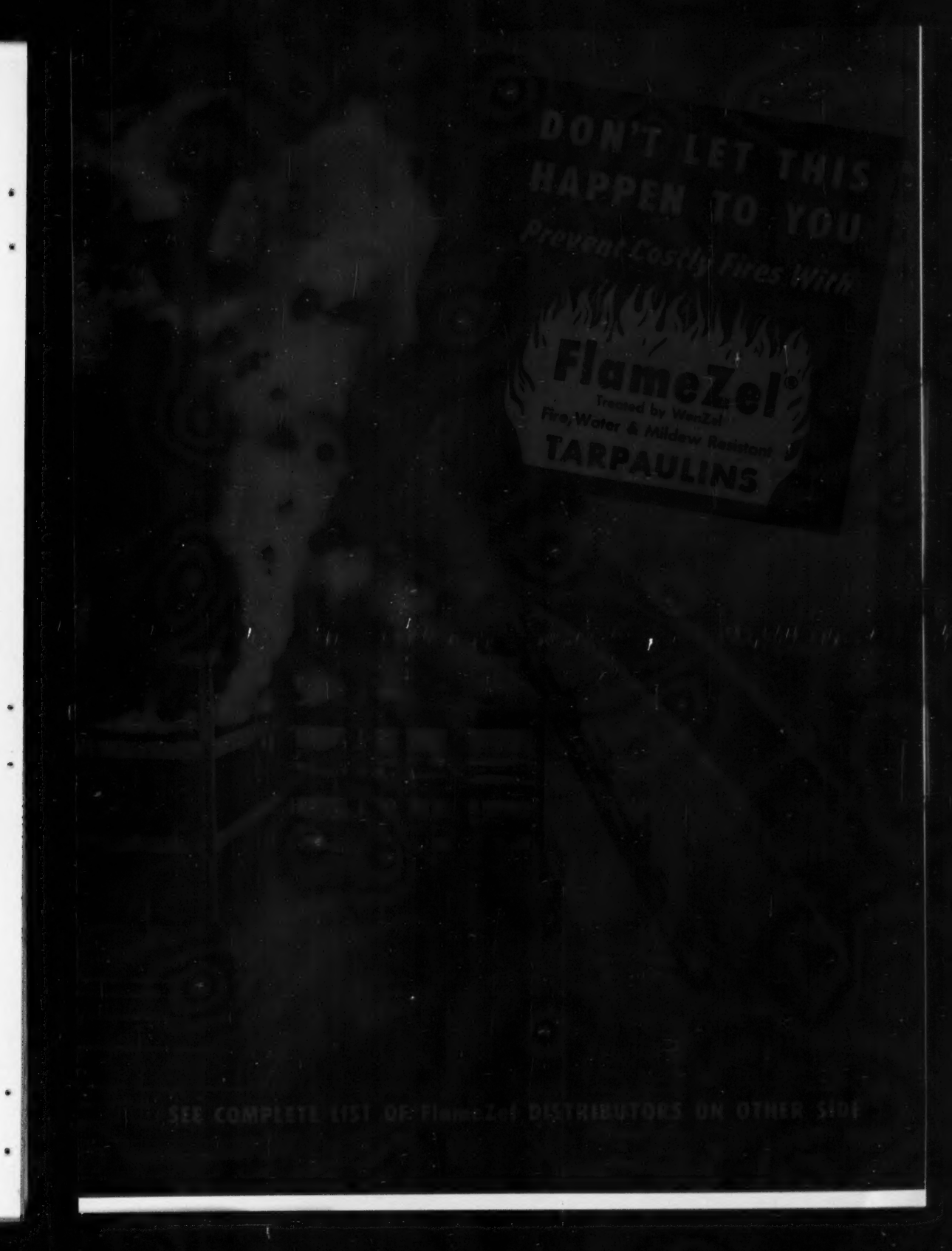
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Wolf Tent & Awning Co., Ft. Wayne, Ind.
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Brother, I know...

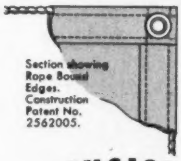
I've seen many a construction investment go up in smoke because of tarpaulins spreading fire. Sparks from a welding torch, a salamander set too close to a canvas windbreak, cigaret butts, etc., were the initial cause, but it was the inflammable tarpaulins that spread the fire through the entire job.

No need to take this risk—now you can get real fire insurance in flame-resistant tarps and at practically the same cost as ordinary tarps. You can prevent ruinous fires and costly delays. Yes, with FlameZel Tarpaulins you can leave the job knowing that your tarps won't kindle costly fires.

PROOF BY THE BLOW TORCH TEST!

ASK YOUR DISTRIBUTOR FOR A BLOW TORCH DEMONSTRATION ON FlameZel

Meets the fire resistant requirements of Federal Specifications CCC-D-746. Manufactured under Wenzel Patents No. 2286744, No. 2436216, No. 2463983 and others.



Section showing Rope Bound Edges. Construction Patent No. 2562005.

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New this season, all FlameZel Tarps are equipped with heavy duty rope bound in edges all around. Prevents rips and tears from starting; grommets won't pull out.

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by A. E. YORK

Service Manager, Link-Belt Speeder Corp.

THE MOST IMPORTANT PERIOD in the life of a crane or shovel comes when it is first put into service—the period when the customer is becoming accustomed to the machine. That's why it is essential that this piece of expensive equipment be started off properly by qualified servicemen. And the qualification of servicemen is the responsibility of the dealer selling the equipment.

Proper instruction covering all adjustments, care and points of lubrication is important at the time of delivery. Furthermore, it is essential that correct operating instructions be passed from one operator to another in the event that the employee originally familiar with operating instructions leaves for another job.

Too often, a shovel or crane shows excessive wear because of indifferent maintenance and improper lubrication. In many cases the problem of too much grease is almost as serious as too little lubrication. Since the danger connected with lubricating certain points is covered at the time of delivery of new equipment, the contractor should see that the information reaches his operating personnel.

Systematic care and maintenance usually can be developed by following carefully the manufacturer's operating and instruction manuals. This includes not only proper care and lubrication, but also keeping the machine clean and making regular inspections of the equipment — inspections which will reveal necessary normal adjustments and which will assure the replacement of parts at the right time.

In the case of old equipment, certain steps should be taken to prolong the life of the old machine. A few precautions can extend the time between major overhaul jobs.

Lubricants, motor oils and greases should conform to manufacturer's recommendations, and should be products of reputable firms. Regular intervals of lubrication will eliminate the guesswork concerning the number of hours worked. Manufacturer's charts on seasonal changes in viscosity should be followed closely.

One important detail is the periodic examination of lubrication tubes. Too often it has been discovered too late that a grease tube has failed or become clogged, and that grease was not reaching its intended goal. When that happens, some bearing will fail for lack of grease, which also may result in damage to a shaft or other important part. Replacing such a part sometimes is difficult and may result in a long, costly shutdown which could have been prevented by careful maintenance.

Clutches should be inspected closely to make sure they are maintained in good condition and adjustment. It should be determined whether or not the clutch is wearing properly. Linings should be examined closely and kept clean and free from grit and other foreign particles to eliminate scoring of drums.

Center pins should be checked and tightened as needed. Drive chains should be kept in adjustment, and sprocket chains examined for undue wear. Bushings should be watched to avert shaft scoring. Engine filters, changed at specified intervals, safeguard the power plant of the machine.

Good maintenance entails the advance ordering of needed parts.

Many parts, such as linings, cables, dipper and bucket teeth essentially are wearing parts, and must be replaced periodically. It is important that such parts be kept on hand for quick and convenient replacements. Experience will indicate other parts that should be

ROCKS ARE ROUGH DIET for shovels but careful operator can minimize wear by good practices. Oiler on this 1½-yd Link-Belt Speeder keeps on the go, keeps machine producing.

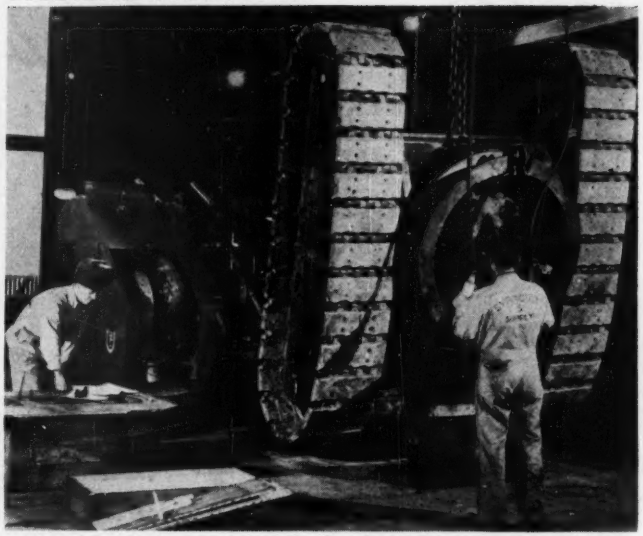
THE RED U-BOLT
TELLS YOU

1 They're drop-forged
2 Hot dip galvanized
3 They're genuine

CROSBY CLIPS

4 They're America's largest-selling DROP-FORGED WIRE ROPE FASTENERS
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA



MAJOR OVERHAULS on power cranes and shovels should have careful planning. Estimate and order parts required and do not disassemble machine until parts are on hand or enroute.

kept on hand to avoid a costly shutdown when such replacements are needed.

By periodic and systematic inspections, it is possible to anticipate many replacements and to have such parts on hand to install at the most convenient time. This is especially important now when replacement parts may not be available as quickly as in normal times, and when uninterrupted operation is more important than ever.

Good housekeeping is conducive to good care and maintenance. A clean machine and good mechanical condition invariably go hand-in-hand.

Periodic cable inspection is vital to all machines. A frayed cable should be replaced promptly, particularly if it is a load-carrying cable. Although it may be subjected to little running wear, the boom hoist cable—which is a load-carrying cable—also should be inspected frequently, since its failure could well result in serious damage or even personal injury. In these inspections, all cable connections also should be checked.

Overhaul jobs, which in normal times have been undertaken without much forethought, assume major proportions in times of emergency such as the nation is undergoing currently.

The first step in an overhaul job is to determine the extent of the job. This calls for a detailed study and examination. Ordering additional material after the original order has been placed can be avoided by making a careful first estimate. Definite shipping dates should be received. Better yet, no equipment should be disassembled until all material is on hand. A small item missing out of a large order can tie up a major repair job because of some supplier's inability to live up to a promise.

Local facilities for the job to be done must be explored to make certain the work can be completed in the least possible time. If local sources prove inadequate, improvisations usually can be made. It may be wise to move the equipment nearer to proper facilities.

With present materials shortages, consideration should be given to rebuilding parts, especially those that can be welded and rebuilt to original dimensions. Track sprockets, track rollers, track shoes — all can be rebuilt with hard-surface rod to extend service life.

Bores that have been worn oversize, frequently can be welded and rebored to standard size to make future replacements easier. Shafting—depending upon application —sometimes can be metal-sprayed satisfactorily. When possible, a plating process should be used to salvage shafts.

Complete overhaul jobs, if properly planned, can be accomplished with a minimum amount of down-time, even under today's conditions.

SHORT
WHERE IT COUNTS
...LONG
ON QUALITY

Model B67 — 63 lbs.

Model B37 — 38 lbs.

Model B87 — 81 lbs. — Sheeting driver head also available.

New Sump Pump Dependability

The VP4 Sump Pump is designed on a new principle of Top-Suction — won't bury itself in a muddy sump. Top-Suction also pulls gritty water away from the shaft seal — protects the seal, shaft and motor from wear — sharply reduces maintenance. "One-shot" lubrication oils entire pump for 24 hours of service.

Shorter from tool-top to handle, Gardner-Denver Paving Breakers are easier to hold! Your men move about the job faster and safer, too — thanks to the exclusive Gardner-Denver safety latch that works like the safety on a gun.

And here are some of the quality *extras* that make these breakers powerful "busters" on your demolition jobs:

Automatic short throw valve — virtually unaffected by wear.

Non-freezing exhaust — maintains top efficiency on cold, damp days.

Renewable chuck liner — protects both tool and breaker against loose-fitting shank.

Integral oil reservoir — insures proper lubrication to all working parts.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

Construction-plant barges inch through marshlands and floating islands as . . .

Pipeliners Lick the Mississippi's Delta To Lay the "Wettest Inch"

PIPE-PUSHING OPERATION—Where ground will support light dragline to excavate ditch, tractor on shore anchors the barge while winch of International TD-14A on deck shoves pipeline into trench. TD-18A with sideboom prepares to set next length into the line.

AT A COST of something like a million dollars a mile, a 16-in. natural gas pipeline is being pushed 90 mi north from Louisiana's Westbay oil field to Chalmette, near New Orleans. All but a few miles is through Mississippi River delta swamps (making this line the "Wettest Inch") where no gas line of this caliber has been attempted before. And the tough terrain, besides raising costs, has dictated unusual techniques.

In only a few places is the ground solid enough to support crawler side-boom tractors. At these spots, the job resembles an ordinary pipeline operation.

Other sections will not support the tractors but will allow a lightweight dragline to gouge out a narrow trench for the pipe. In this operation, a 27x120-ft work barge anchors at one end of the trench and a winch tractor on deck shoves the pipe into the slot. A 20-man crew on such a spread hits a daily average of 35 sections of 16-in. pipe in 40-ft lengths. As much as 5 mi of pipe is pushed from a setup.

LAND-BASED OPERATION—In the few places where ground will permit, sideboom TD-18As handle job as in more normal pipeline procedure. But even here, water and caving banks are problem.

BARGE-PUSHING OPERATION—In open water and through floating islands pictured at top of facing page, spread moves through dredged channel by pushing itself against pipeline as it is laid.

A third method is used in open water and through completely unstable islands, some of which even drift with the wind and tide. First a channel 36 ft wide is dredged out to accommodate the work barges, and a pipe end is anchored to shore. Then, as new 40-ft lengths are welded on to the line, the entire floating plant is forced ahead by pushing on the assembled pipe in an action similar to poling a boat. Usual production of a spread like this is 50 to 60 sections per day with a crew of 22.

Pipe for the job is prepared at two yards near New Orleans. Here the 40-ft lengths receive a ½-in. coating of somastic material to protect them from acids and corrosion, and a ⅞-in. concrete jacket to bring the weight of the 16-in. pipe up to 152 lb per ft. Barges deliver the sections to the pipelaying spreads where, after being welded into the line, their joints are coated before sinking into the delta.

To Produce Aluminum

Brown & Root Inc., Houston, is building the 90-mi pipeline for United Gas Pipeline Corp. It starts at the gulf tidelands just west of the ship channel entrance to the Mississippi, crosses that river at Venice, La., then heads north along the gulf (frequently in open water) past Pointe La Hache and Delacroix to Chalmette. A feeder line extends across the Mississippi at Pointe La Hache to reach several oil fields to the west. Main customer for the gas will be Kaiser Aluminum & Chemical Corp.'s final reduction plant for aluminum, now under construction. The gas will power turbines for electrical generation.

ANCHORED WINCH TRACTOR that moves spread ahead waits on stern of main barge while new pipe lengths are welded on (top photo) and joints doped (above). Seaplane carries Brown & Root superintendent Kincey, who needs this fast travel to cover wet, 90-mi job.

It's Top That Makes

★ This TD-6 bulldozer handles dozens of odd jobs on a construction site. Here it builds a ramp for a housing project in Brooklyn, N.Y.

★ Real estate development is speeded by this TD-18 Bullgrader, shown building a boat channel near Sarasota, Fla.

★ Ability to dump well back of its wheels is a feature that means safe, sure dumping for this G-58 two-wheel scraper, working near Colorado Springs, Colo.

★ Full visibility and precision control contribute to peak efficiency on this TD-9 Dozer-Shovel, stockpiling sand at East Hampton, L.I., N.Y.

★ Fast loading and easy dumping, with Bucyrus-Erie's exclusive two-part hinged apron, makes this S-91 scraper an ideal tool for road building in Nebraska.

Performance' Stars Like These!

FOR the dependable, stand-out performance that means high output every shift, low-cost operation and most efficient use of tractor power, look to the stars in Bucyrus-Erie's line of tractor equipment. They're better because they're designed *with* and *for* International industrial tractors . . . engineered from the ground up to put more tractor horsepower to effective use, to retain the tractor's own operating characteristics, to prevent undue wear and maintenance on tractor parts. As a result, Bucyrus-Erie tractor equipment enables you to do *more* work per tractor horsepower. And Bucyrus-Erie quality construction, high-grade materials and craftsmanship mean long, reliable, profitable service. Ask your International Industrial Tractor Distributor for complete details!

SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

See

Your International Industrial Tractor Distributor

COMMENT
from the
BUTLER ENGINEER

December, 1951

. . of martinis, squashed olives and 6 yard Mixers

There is a Butler Bin actually in use for olive pulp storage, and if all the olives in the nation's Saturday night crop of martinis were squashed together they'd just about fill it. (Estimate *not* based on 1945 Census). Anyway, the olive pulp tycoon's problem was to get accurate indications of low, intermediate and high bin load levels. Martini load levels in the human being can be determined by direct observation — but not olive pulp in a bin.

The answer to the problem? The Butler Bin Level Indicator — an alert, sensitive but very simple device actuated by a pressure-sensitive diaphragm. Interestingly enough, it *always* works. Not only with olive pulp but also with cement, sand, gravel, coal; in fact with virtually any bin stored material. And like Mr. Wrigley's flavor — it lasts and lasts.

I'm not supposed to write advertising. I'm strictly an engineer. But I did think you'd like to know.

Here's the "Did You Know" Department: we don't make concrete mixers, but of seven 6 yard mixers which have been manufactured, six of 'em are installed in Butler Central Mixing Plants.

The point is: of the gigantic new commercial Central Mixing Plants where very high production is demanded, 6 out of 7 turn to Butler.

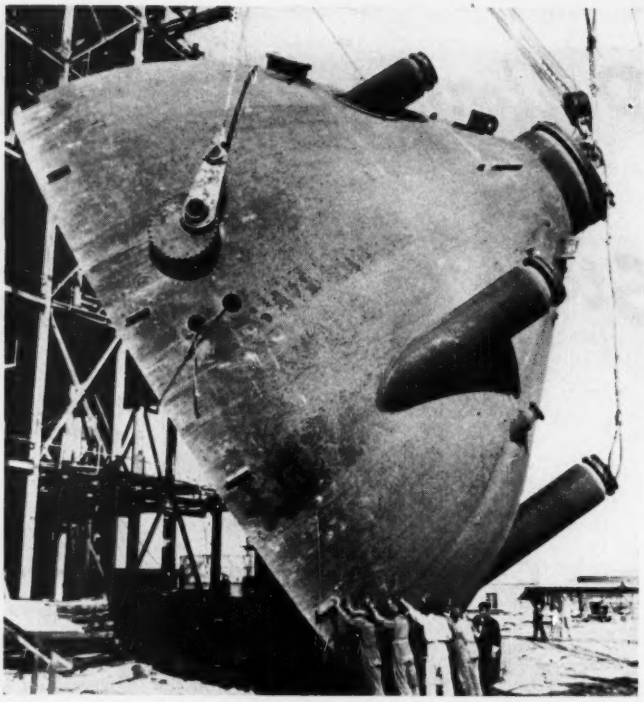
And the smaller fellas do too, for they've found that Butler gives them the same conscientious engineering attention.

Say, thinking about that olive pulp Bin: when they ordered the bin elevator shouldn't it more accurately have been called a bucket olivator?

See you in '52.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN



CONE IS TIPPED and rotated gradually as hoisting begins. Two convenient lift points were provided by running large pipe through 47-ft dia shell to extend at each side. Tackle on apex controls inverting.

Single Operation Inverts and Places 100-Ton Cone

RECENT DEVELOPMENTS in international politics focused world attention upon the Abadan Refinery of the Anglo-Iranian Oil Co. in Iran. News pictures have publicized the extensive plant and its huge components, built and operated by British engineers.

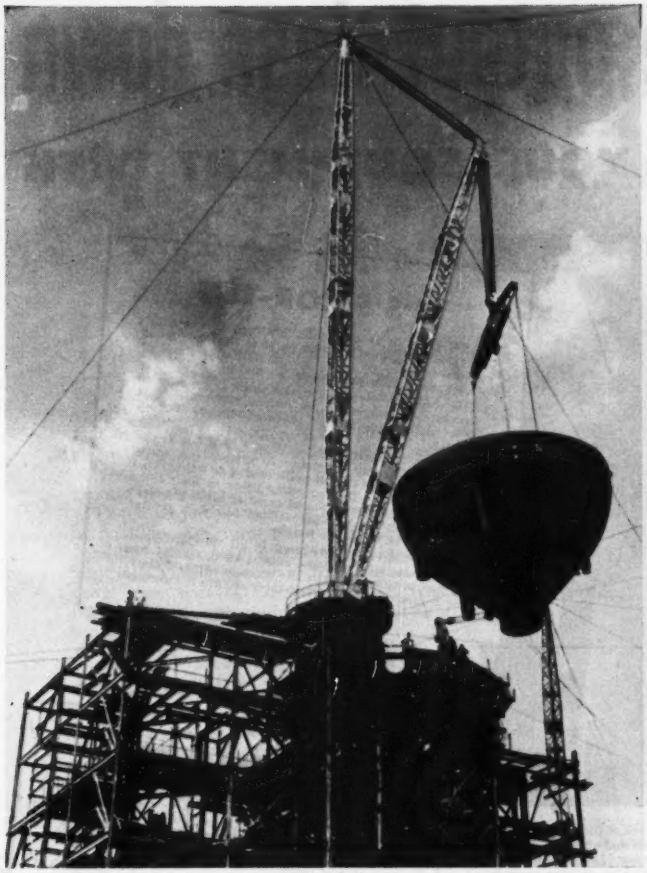
Erection of six regenerators on the site shortly before the British-Iranian dispute arose produced some unusual techniques in handling massive steel components. The regenerators are part of a fluid catalytic cracking unit which has a capacity of 30,000 bbl of high-octane gasoline a day.

Each regenerator, welded and erected at Abadan, weighs about 540 tons and is more than 160 ft high. To house and support the six units—which, with their vessel linings, totaled more than 3,000 tons—2,000 tons of structural steel and deck plates were required.

Trickiest single operation was the placing of a 100-ton steel cone atop each regenerator. The cone was fabricated on the ground alongside the structure with its base down. In addition to lifting the bulky cone to the top of the structure, it was first necessary to invert it to get it into proper placement attitude.

Conveniently, there were two large nozzle openings directly opposite each other in the cone, near its large open end. A shaft was made of two sizes of pipe telescoped one inside the other, long enough to span the 47-ft dia and provide lift points on the outside for the cables from the lifting beam.

Position of the lifting shaft was



NEAR THE TOP, the 100-ton steel cone is more than 100 ft above the ground, and guy derrick is ready to swing it into position for precision setting on a supporting skirt section of the regenerator.

not close to the center of gravity, so it was necessary to provide extra tackle to prevent an uncontrolled swing of the cone while it was being rotated 180 deg by the main lifting derrick. To accomplish this, a set of blocks was connected to the center of the lifting beam and the tip of the cone. Thus, rotation of the cone became a simple, controlled procedure after the unit had cleared the ground.

Fabrication on the site and erection of the six cracking plant vessels was done by Foster Wheeler Corp., New York. Rotating and hoisting of the cone was done with a guy derrick—product of American Hoist and Derrick Co.—footed securely atop steel scaffolding 108 ft above the ground. Its longest reach was 268 ft above ground level.

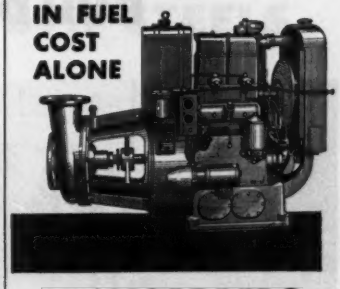
Vent All Hollow Parts

IT IS IMPORTANT that jacketed containers and hollow parts be vented properly before heating them or welding or cutting with a torch. Air or gas confined in a closed vessel expands greatly when the temperature is raised and may create pressures great enough to explode the part. Venting can be done by drilling a small hole which can be plugged after completion of the operation.

Sand & Gravel Operator

SAVES $100.00

PER MONTH IN FUEL COST ALONE



with NORDBERG Diesel Pumping Unit

Read what Mr. V. F. Stich, Sand and Gravel Operator of Lena, Illinois, has to say about his Nordberg 2-cylinder 30 hp "4FS" Diesel Pumping Unit:

"I was using a gasoline engine powered pump to furnish water for my gravel washer. This engine, during a ten hour day, used about 35 gallons of gasoline to deliver 200 GPM for the gravel washing operation. Several months ago I replaced this unit with a Nordberg type 4FS Diesel pumping unit. My Nordberg Diesel uses only 16 gallons of low cost Diesel fuel and I'm getting the same capacity out of the new pumping unit. That change to Nordberg is saving me about $100.00 a month just in fuel costs alone."

This is but one more example of results users get with Nordberg 4FS 1, 2 and 3-cylinder Diesel power units for pumping, electric service, and straight power jobs . . . in sizes up to 45 H.P. or 30 K.W.—all offering maximum economy, reliability, safety and long life.

Send for Free Catalog Today!

Nordberg Mfg. Co.,
Milwaukee 7, Wis.

Send catalog covering 1, 2 and 3-cylinder Nordberg Diesels. I am interested in a unit for the following service:

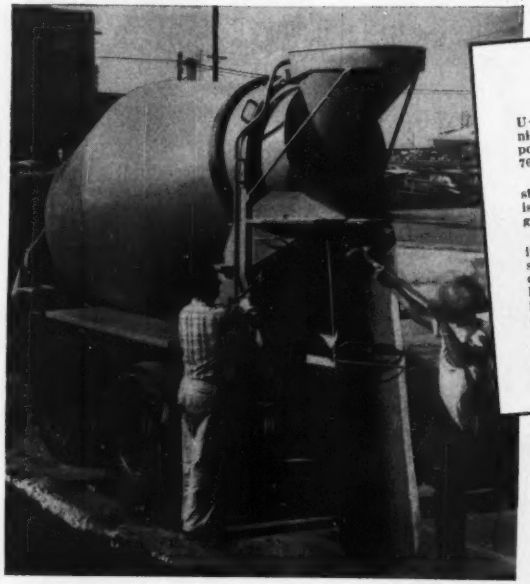
Your Name_____
Company Name_____
Address_____
City_____ Zone____ State_____
4FS551-R

NORDBERG MFG. CO., Milwaukee 7, Wis.

NORDBERG
BUILDERS OF AMERICA'S LARGEST LINE OF HEAVY DUTY DIESELS

Want more output, less down

BUILD YOUR EQUIPMENT WITH



"We prefer U·S·S COR-TEN," says Mr. Ross Castendyck of the Challenge Mfg. Co., Maywood, Cal., "because of its superior corrosion and abrasion resistance as well as its high strength. These permit us to reduce our Mixer weight 10% to 15% and at the same time to build a 20% stronger unit that will stay in service at a lower maintenance cost."

U·S·S COR-TEN

U·S·S COR-TEN is a ductile, low-carbon chromium-nickel-silicon-copper-phosphorus steel having a yield point of 50,000 psi min., and a tensile strength of 70,000 psi min. in thicknesses ½" and under.

Its resistance to abrasion and shock is superior to structural carbon steel; its fatigue resistance—that is, its ability to withstand repeated stresses—is 60% greater.

What particularly distinguishes U·S·S COR-TEN is its unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel, 2 to 3 times that of copper steel. This property helps to assure the long life and low maintenance cost of any equipment in which COR-TEN is used, whether to obtain greater durability or to reduce weight.

U·S·S COR-TEN is produced in all standard products—plates, shapes, bars, sheets, strip, special cold formed sections and wire. Recommended particularly for application in light and intermediate thicknesses.

U·S·S MAN-TEN

U·S·S MAN-TEN is a grade of manganese-copper steel that, at relatively low cost, provides toughness, workability and weldability in a higher degree than obtainable in carbon steel of the same strength level. Its atmospheric corrosion resistance is slightly higher than that of copper steel.

U·S·S MAN-TEN, in thicknesses up to ⅛" inclusive, has a yield point of 50,000 psi min. and tensile strength of 75,000 psi min. Its abrasion resistance is greater than that of structural carbon steel (ASTM A7); its resistance to sudden shock is about 20% greater; its fatigue strength is approximately 40% higher, insuring greater ability to withstand vibration and reversal of stresses.

U·S·S MAN-TEN is produced in plates, shapes, bars, sheets, strip, special cold-formed sections and other forms. It is particularly recommended for use in light and intermediate thicknesses.

U·S·S TRI-TEN has long been used to assure the dependability for which Caterpillar equipment is famous. The weight-saving and space-saving advantages in proportion to the strength of this steel has resulted in their engineers using it regularly.

time, low maintenance costs?

THESE U·S·S HIGH STRENGTH STEELS

and give it the STAMINA to stay on the job!

● When the defense effort really gets rolling, the construction industry will face the biggest job it has ever tackled. That's when your big-capacity, high-speed, high-powered equipment will pay off, BIG. But only if it is thoroughly *dependable*, only if it is rugged enough to stand up, day after day, under the hardest kind of service and regardless of weather or ground conditions.

That's why it is so important to minimize, as far as possible, structural failures that can put costly, hard-to-replace equipment out of business. That's why it is vitally necessary to make sure that your drag lines, shovels, crawlers, 'dozers, trucks, and other earth-moving equipment are built as strong, as tough and as durable as possible.

You can do it with
U·S·S HIGH STRENGTH STEELS

With high-strength U·S·S COR-TEN, U·S·S MAN-TEN and U·S·S TRI-TEN, equipment breakdowns that hamper operations and run up costs can be greatly reduced. With these famous "steels that do more" you can build maximum strength and toughness in vital parts ordinarily prone to failure. With them, high resistance to wear, fatigue, abrasion and impact can be incorporated. And if your equipment must operate in sub-zero temperatures or under unusually corrosive conditions, high resistance to these destructive forces can readily be secured.

In addition, these U·S·S High Strength Steels—because they have a yield point 50% higher than ordinary structural steel—can be used to materially increase the strength of parts without increasing their weight. Or they can be used in lighter sections without in any way diminishing strength or stamina. In the latter case, *substantial savings in steel will result*. This is important now, with steel in restricted supply.

Our engineers for 16 years have cooperated with manufacturers in applying U·S·S High Strength Steels to construction equipment famous for its reliability, long life and low maintenance cost. They will be glad to show you how these tougher, stronger, more durable steels can be applied to give your equipment the stamina to stay on the job.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · UNITED STATES STEEL COMPANY, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S TRI-TEN

This manganese-nickel-copper steel has a yield point of 50,000 psi min. and a tensile strength of 70,000 psi min. in thicknesses ½" and under, with moderately lower values as thickness increases to a maximum of 4". It has superior toughness and ability to withstand shock at sub-zero temperatures. It has greater resistance to abrasion than structural carbon steel (ASTM A7) and its fatigue resistance is 50% higher. U·S·S TRI-TEN'S resistance to atmospheric corrosion is slightly superior to copper steel.

Because U·S·S TRI-TEN has very good welding properties in intermediate and heavier thicknesses, this grade of U·S·S High Strength Steel is highly recommended for application in heavy duty equipment where maximum ruggedness and strength with minimum weight are prime requisites. Produced in plates, structural shapes, bars and bar shapes.

U·S·S TRI-TEN, used in the stiff leg, boom and crowd handle of this giant Marion 45-cu. yd. shovel, assures maximum strength and toughness with minimum weight. TRI-TEN'S excellent weldability and its superior resistance to embrittlement in sub-zero temperatures make it first choice for such heavy duty equipment that must be able to perform under rigorous and extreme climatic conditions.

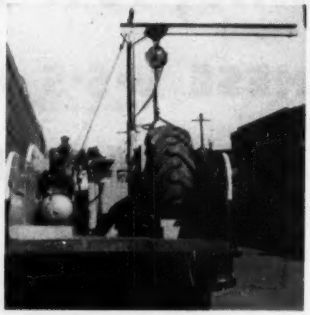
UNITED STATES STEEL

Special Truck Serves Big Tires

SPECIAL SERVICE TRUCK takes 27.00x33 tire in low deep well, handled by chain hoist on overhead trolley. Truck was designed by Goodyear to meet specs set up by Hawkinson Treads, Inc., Pittsburgh. That's Frank Fox, Goodyear's expert on big off-the-road tires, at left.

AN EXAMPLE of how tire distributors are constantly improving service to contractors in taking care of big off-the-road tires is a special maintenance truck designed by Goodyear Tire & Rubber Co. for Hawkinson Treads, Inc., Pittsburgh. Ed Feigenbaum, Hawkinson president and general manager, set up the following specifications for a mobile maintenance unit that would serve his contractor clients: Handle tires up to 27.00x33; highly maneuverable and capable of operation with minimum personnel; eliminate heavy manual labor and physical strain; and reduce cost to customers, especially by cutting downtime of tire change and handling.

REMOVABLE SIDE PANEL is replaced after tire is loaded. Tire well is low enough to keep load below underpass clearance limits.



READY FOR THE ROAD, except for lowering telescoping mast on crane and swinging boom back over truck body in the clear. Gas-driven compressor can inflate big tires in a hurry.

Goodyear met those spec requirements with the 1½-ton International truck shown in the accompanying pictures. It includes these features and equipment:

Deep well on one side for carrying big tires in upright position, low enough for normal underpass clearance.

Chain hoist on swinging trolley boom attached to telescoping pipe mast.

Large gas-driven air compressor.

High-speed 30-ton hydraulic jacks.

Power wrench.

Power rim remover.

Bead breakers.

Compartment for tools and supplies.

An improved version of this big-tire service truck since has been designed for use of the contractors on the tremendous earthmoving job for Oahe Dam, near Pierre, S. D. The newer truck has a hydraulic hoist that handles 3,000 lb with ease. This truck also is equipped with a larger, 35-ton, high-speed air-operated jack, and its low-slung "side pocket" compartment is increased in size to accommodate a 30.00-33 tire.

Photos and information were supplied by Goodyear Tire & Rubber Co.

Our Defense Program Faces a Crisis

A major crisis will soon confront our defense program.

It is not a crisis in raw materials. To find enough materials, from steel to cobalt, for defense production is a serious problem. But it is one that is being solved.

It is not a crisis in manpower. Shortages of workers with special skills hamper production, but these shortages are being relieved, slowly.

It is not a crisis in manufacturing capacity. American industry's record-breaking expansion is, with very few exceptions, keeping abreast of defense needs.

The coming crisis will be one of finance. It will rise from our failure to provide the means to PAY FOR the defense program we now have under way.

A $15 Billion Deficit?

Congress has approved a defense program which is scheduled to raise *total* federal spending in the year from June, 1952, to June, 1953, to somewhere between $85 and $90 billion. Additional appropriations for more air power and atomic development, which are now proposed, would add several billion dollars.

But Congress has not approved a tax plan to match such spending. With the new levies enacted in this session, tax collections during the 1952-53 fiscal year are estimated to fall somewhere between $70 and $75 billion. That would be roughly $15 billion short of balancing the budget. If the defense program is expanded, the deficit will be that much greater.

We have not yet felt the impact of the crisis that would accompany a federal deficit of this magnitude. Federal tax collections currently are big enough to balance federal expenditures. But the defense program is scheduled to boost the annual rate of federal expenditures $25 billion in the next year.

To Meet the Crisis

By January the crisis will be clearly in sight.

Then the President will present his budget. After that, Congress must act to close the broad gap between government income and government spending. If it fails to do that, the whole defense program will be menaced by weakness in its financial foundations. That weakness might well take the form of another destructive wave of inflation.

We have three ways to meet this crisis.

The best approach, of course, is to cut unessential expenditures. That can make a real dent in the deficit. The second is to collect more

taxes. The third, and by all odds the most dangerous, is to have the federal government meet its deficit by going deeper into debt. Borrowing, which might feed inflation, can easily lead to disaster.

Near Income Tax Limits

It will not be possible to raise taxes to meet the deficit merely by increasing further the rates on corporations and on persons in the upper income brackets. Congress has about scraped the bottom of that barrel.

The Senate Finance Committee said as much in reporting this year's tax bill. The Committee reported that it had "serious doubts as to the feasibility of raising any substantial additional amounts of revenue from income tax sources." The Committee observed that recent tax legislation brings the burdens of most corporate and individual income taxpayers close to the World War II peaks, and actually carries the rates paid by many taxpayers above those peaks.

Our ramshackle federal tax system must be thoroughly overhauled in order to broaden the tax base if it is to produce more revenue—without doing much more harm than good.

The shocking fact is that no one seems ready to act along any line that might enable us to surmount the crisis.

That fact of itself aggravates the coming crisis. And next year's presidential election doesn't make it any easier to move effectively. Both parties will shrink even more than normally from backing any program that might irritate any considerable number of voters.

If we are to meet this crisis on the tax front in an orderly way, the technical work should be in progress right now. To a large extent it is being ignored.

If we are to enforce the vitally essential program of government economy, there is the same urgent need to get under way the spade work that is required.

And if—as a last miserable expedient—we decide to let the federal government drift deeper into debt, it must have a well-developed program of borrowing from individuals and other investors, such as insurance companies, rather than from the commercial banks. Borrowing from commercial banks might speedily translate the deficit into more and more price inflation. No adequate program of borrowing from savings is now in sight.

Now Is the Time

It is possible, of course, that international relations may improve sufficiently to make it safe for us to slow down the rearmament program. If that should happen, the fiscal crisis would not be so critical. But that kind of good fortune has been notably absent in recent years.

Lenin, patron saint of Communism, is quoted to the effect that to destroy a political and social system such as ours "you must debauch its money."

We shall set democracy to digging its own grave if, through our preoccupation with politics during the presidential campaign, we pave the way for further debauchery of our money.

If we really want to avert that disaster, now is the time for us to get going.

Once the crisis is full upon us, it will be too late.

McGraw-Hill Publishing Company, Inc.

PAYLOADERS ON RUBBER

Get the Job Done FAST....

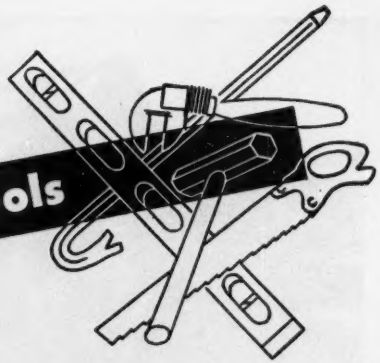
This big 1½ yd. HM PAYLOADER with its combination of large pneumatic tires and 4-wheel drive gives you fast-action traction on all kinds of footing — on sand, stone, snow, clay or mud. It gives you crawler-like traction at far less maintenance expense, PLUS speed when you want it and the ability to work on pavements and to travel over streets and highways at 16 m.p.h.

This PAYLOADER also gives you easy operation and maneuvering speed with its power-boosted steering and full-reversing transmission having four speeds in reverse as well as forward. Once you see the Model HM in action you'll know why hundreds of contractors are its enthusiastic owners and boosters. Full information on this 1½ cu. yd. model and other size PAYLOADERS is yours for the asking. The Frank G. Hough Co., 706 Sunnyside Avenue, Libertyville, Illinois.

PAYLOADER

THE FRANK G. HOUGH CO. ... SINCE 1920

Would you buy new tools



for every job?

As an experienced contractor would you buy construction tools that could only be used once or twice and then thrown away? Of course not.

That's why we believe you'll be interested in re-usable Armco Steel Sheeting. It can be used again and again to keep costs low. One contractor reported that his Armco Sheeting had been pulled and re-used more than 100 times.

Pulling the units is simple with the aid of a convenient hole near the top of each section. Between jobs Armco Sheeting can be nested in compact bundles for easy storage.

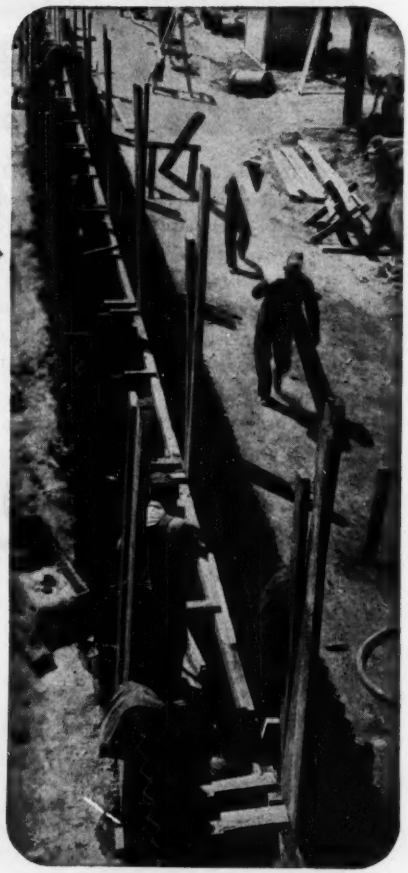
Light weight and a small displacement area make Armco Steel Sheeting easy to handle and drive. Even 20-foot lengths can frequently be driven to full penetration before excavation. You can use a hand maul or power hammer.

Armco Sheeting is amply strong. You'll find it an ideal choice for shoring trenches, constructing core walls, cofferdams and many other temporary or permanent needs. Write us for complete information. Armco Drainage & Metal Products, Inc., 3461 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

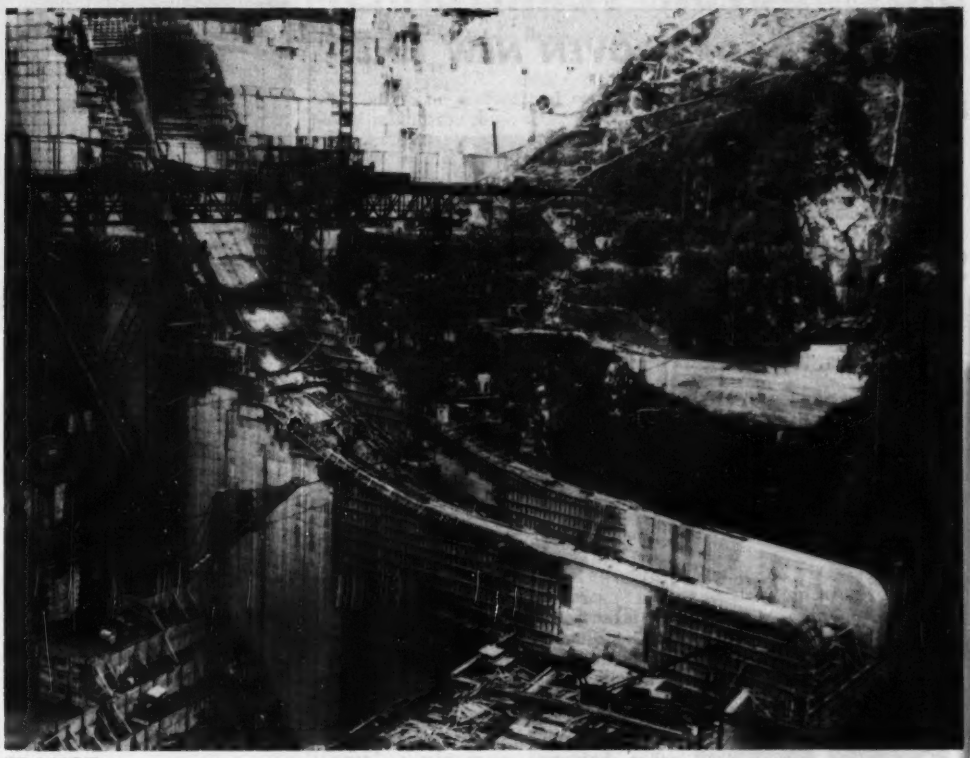
Export: The Armco International Corporation

Armco Steel Sheeting ARMCO

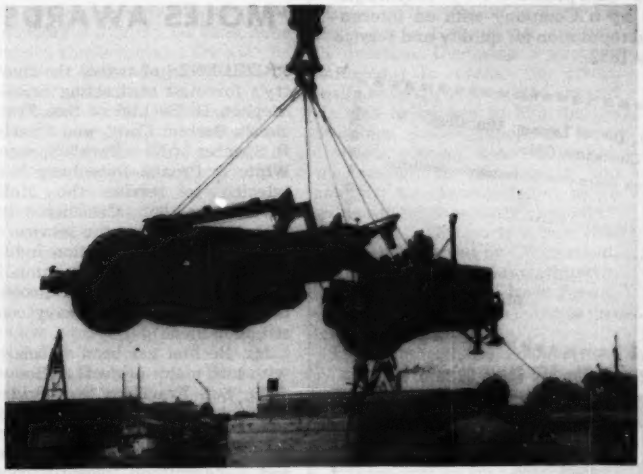
More scrap means more steel
turn yours in today!



CONSTRUCTION 'ROUND THE WORLD . . .



FRANCE—Ski-jump spillway at Bort-les-Orgues Dam also serves as part of power-plant roof. Dam itself is concrete poured inside precast facing blocks that act as forms too. Blocks are 5x7 ft and weigh 3½ tons; hold 5-ft concrete lift without bracing or ties. Dam contractor, Enterprises Metropolitaines et Coloniales, makes own cement on job from slag.—ECA photo from Acme



ARGENTINA—Carefully slung, 19-ton Terracobra is loaded as a unit into boat's hold for move to inaccessible Corrientes job of Perales, Aguiar & Cia. Unloading site lacks re-assembly facilities, so rig goes in running condition rather than in two pieces.

AUSTRALIA—Floating collar filled with creosote stops borer damage to piles. One 24-hr treatment protects pile for 1 yr.

DISTRIBUTOR TERRITORIES

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self-priming centrifugal pumps

Here is the outstanding line of self-priming Centrifugal pumps in the field . . . fast sellers for an aggressive Distributor to handle. These pumps are now in operation all over the world. They are of all welded steel construction, with automatic priming, non-clogging impeller, hardened wear plates, large access plates, tested trouble free shaft seals. Sizes up to 125 M. In 3", 4", 6", 8", 10" high pressure, 3", 4" diaphragm. Built by a Company with an international reputation for quality and service since 1852.

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Gentlemen: Please send me information on Distributor territories now open.

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See us at the AED Show, Chicago, January

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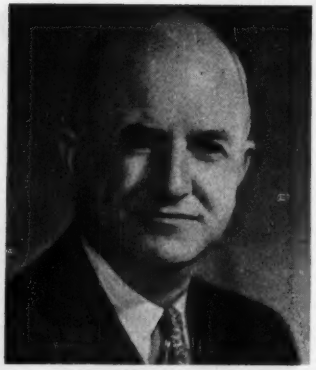
division of LEYMAN MANUFACTURING CORPORATION



S. D. Bechtel and . . .

C. B. Spencer get . . .

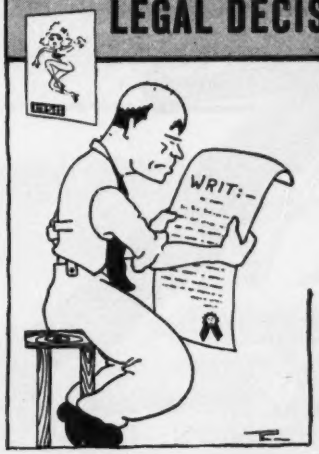
MOLES AWARDS

PRESIDENTS of two of the country's foremost contracting firms—Stephen D. Bechtel of San Francisco's Bechtel Corp., and Charles B. Spencer of New York's Spencer, White & Prentis Inc.—have been selected to receive the Moles Awards for 1952. Considered the highest recognition for service to the American construction industry, the awards are given annually by The Moles, a New York association of tunneling and heavy construction men.

Mr. Bechtel has been associated with such major projects as Hoover Dam, San Francisco Bay Bridge, Big Inch and Super Inch pipelines.

Mr. Spencer's firm, specializing in heavy and unusual foundations and underpinning, recently completed an extensive such job on the reconstruction of the White House in Washington.

LEGAL DECISIONS CONCERNING CONSTRUCTION



The Double Lot and Lien

THE OWNER owned two adjoining lots and made a contract with the contractor to erect similar buildings on both lots.

The contractor completed the buildings, could not collect the balance due according to the contract and filed a mechanics' lien against the buildings.

"Your lien is worthless. You built two buildings and should have filed two separate liens. The single lien on both buildings is no lien at all," the owner protested.

"It was a single contract, and I'll take my chances on a single lien," the contractor maintained, and the weight of authority in the American courts is that work done under a single contract for a single owner on adjoining lots may be put in a single lien.

"Where a row of houses is to be built pursuant to one contract, upon contiguous lots, and of the same materials, and the work upon all is to be carried forward and completed within the same time, it might be impracticable for the contractor to keep a separate account of the materials and labor for each house, and file a separate lien for each. This statute was intended to relieve him from the necessity of doing so. To limit the operation of the statute by construction, and substitute therein the words, 'one entire contract,' for 'one general contract,' would defeat the very object of the statute. The purpose of the contract in question was to secure the building of a row of three houses of uniform material, style, and price, all to be erected and completed within the same time, upon one contiguous tract of land. The contract was general; that is, it related to and included all of the houses. The contractor constructed the three houses pursuant to the purposes of this one general contract, and he was not bound to apportion the amount of his lien between the several houses, and file a separate lien upon each," says the Minnesota Supreme Court, and the same rule holds in Arkansas, Colorado, Connecticut, Indiana, Iowa, Kansas, Maryland, Massachusetts, Missouri, Nebraska, New Jersey, New York, Pennsylvania, Texas and Washington.

Now what if the facts had been the same except that the lots had been on opposite sides of the street, and the contractor had filed a single lien. Could he enforce the lien?

In the majority of the American Courts the law is against the contractor on this point.

"We find nothing in the statute as it now exists, authorizing a contractor to file a single lien for the whole amount due him for labor and material furnished in the erection of houses located on lots which are not adjoining or adjacent to one another. As appellant has failed to comply with the terms and provisions of the statute in filing his claim for a lien against the lots in question, the same cannot be enforced. He could, no doubt, easily have apportioned the amount claimed to be due to him for the buildings erected upon the several lots, placing, if he so desired, the amount of the lots in one amount; but having failed to do so, he cannot now justly complain," said the Illinois Courts, a rule that has been approved by Connecticut, Indiana, Kansas, Massachusetts, Minnesota, Missouri, New Jersey, Oregon, Pennsylvania, Rhode Island and Texas Courts.

On the other hand, however, the Arkansas, Iowa, Maryland, Nebraska, North Carolina, Oklahoma and Virginia Courts have upheld a single lien even where the lots do not adjoin.

"There was no separate contract between the owner and the general contractor for each house, nor was there any provision in the contract that a separate account for each house should be kept. But the contract was for an entire work, and the contract between the general contractor and the owner was of the same nature; that is, for materials, not for each house separately, but for the entire work for which he had contracted with the owner. It is clear, therefore, that, as between the general contractor and the owner, the two buildings must be considered as, in effect, one piece of work, and that the right of the former to a joint lien on both for any balance due him, upon complying with the terms of the statute, could not have been successfully controverted. Indeed, in such a case the lien must be joint or not at all; for although a lien is a creature of the statute, it must have its foundation in a contract," is the reasoning of the Virginia Courts.

One leading case relevant to the above situations is Burel vs East Ark. Lumber Co. which can be found in 129 Ark. 58.

The New York Bylaw

"ALL PAYMENTS of money made and received to or at this bank must be examined and objected to before the party making or receiving the same leaves the bank," a certain bank bylaw stated. The contractor paid money to the bank, came back half an hour later and objected that he had not been credited with the full payment—and the bank fell back on the bylaw.

"That's a valid bylaw of the bank, and it's printed right in your passbook," the teller pointed out.

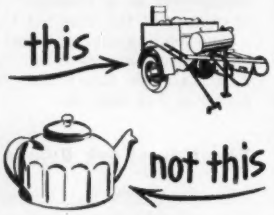
"It may be a bylaw, but it isn't a valid one," the contractor contended.

"Why not?"

"Because a bylaw must be reasonable to be legal, and yours is everything else," the contractor maintained. And the New York Supreme Court ruled in his favor in Mechanics & Farmers Bank *vs* Smith reported in 19 Johns. N. Y. 115.

"The liability of the bank is established, if the money was actually received, notwithstanding the bylaw relied on," the Court said.

For road repairs, you need the right kind of kettle



Same way with trucks. Get one that fits the job!

Thrifty power for rugged jobs... with dependable DODGE "Job-Rated" TRUCKS

Give a Dodge *"Job-Rated"* truck the rough treatment your job demands . . . and watch it perform with *low-cost dependability* year after year!

Plenty of thrifty power! For example, 2½-ton models have a rugged, powerful engine that's rated at 114 h.p. And, to assure even greater power with top economy, high-tonnage models (2¾-ton and up) are offered with twin carburetion and exhaust system.

But that's not all! Back a Dodge into a tight spot—see how easily and sharply it turns, how easily the steering wheel turns! New worm-and-roller steering gears on many models are just one of many reasons why Dodge *"Job-Rated"* trucks are easier to handle.

Then consider advantages like the new moistureproof ignition system and new high-torque capacity starting motor—and you'll know why new Dodge *"Job-Rated"* trucks are more dependable, even in the worst weather.

You'll save in many ways with a truck that fits your construction operation—a Dodge *"Job-Rated"* truck. Talk it over with your friendly Dodge dealer *soon!*

How Dodge trucks are *"Job-Rated"* for the construction business

A Dodge *"Job-Rated"* truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

Every unit from engine to rear axle is *"Job-Rated"*—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

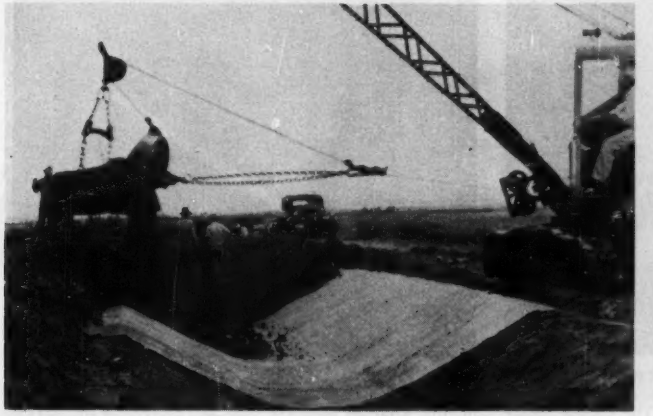
Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

CONSTRUCTION EQUIPMENT NEWS

A Preview of New Machinery, Tools and Equipment That Will Help You on the Job

JAMES M. CONNOLLY, Equipment Editor

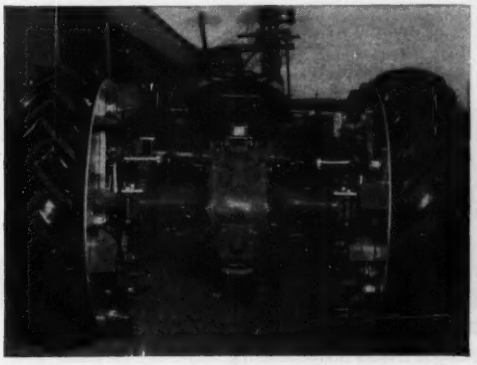


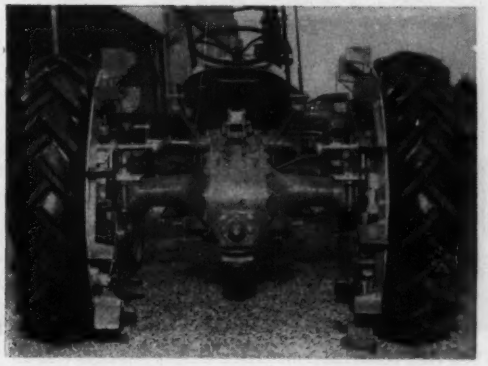
DITCH AND CANAL LINER CONTROLS SEEPAGE AND EROSION

The soil that was draglined out of this irrigation canal a short while ago goes right back in—to cover overlapping layers of a prefabricated asphaltic membrane lining reinforced with Fiberglas. Developed in cooperation with the Bureau of Reclamation, the liner can be installed with hand tools and unskilled labor, if necessary, at any time during the year and can be stored indefinitely without damage. Two men can install it, and a crew of four to six men can apply 200 to 300 yd per hr. Canal or ditch should be over-excavated, dragged and rolled to a smooth surface and side-walls provided on top with an anchor for liner. Rolls are 3x36 ft and can be applied crosswise or longitudinally. Minimum overlap is 3 in. and a rapid-setting cutback asphalt is used for sealing.—**Owens Corning Fiberglas Corp., Toledo 1, Ohio.**

NEW TRIPLE ROLL CRUSHER

This 54x24-in. triple roll crusher, the big brother of Pioneer's 40x22 and 30x18, can be installed for stationary or portable work. Stage of reduction varies from 6¼ to 2 in. when producing minimum sizes 4 to ¼ in. minus, respectively. According to manufacturer, normal production will vary from 35 tons/hr of ¼ in. minus to 500 tons/hr of 4 in. minus. **Pioneer Engineering Works, Minneapolis 15, Minn.**



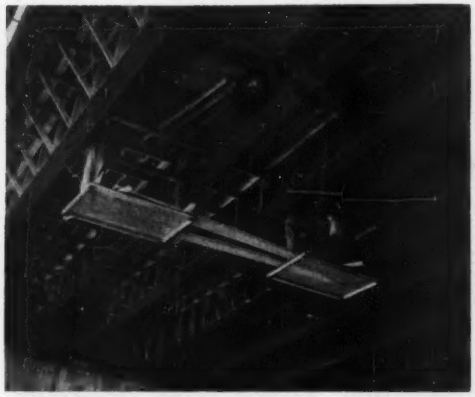


RETRACTABLE LUGS FOR RUBBER-TIRED TRACTORS

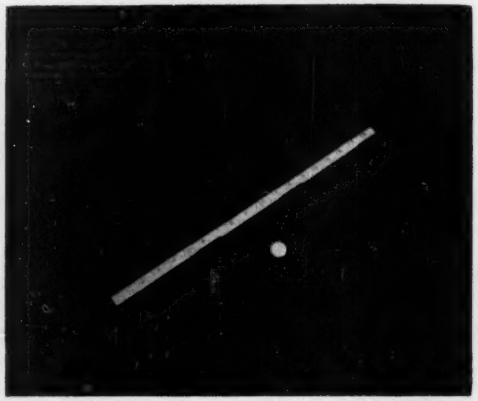
After experimenting with different kinds of hand-bolted lugs, blocking and jacking of tractors, etc, this manufacturer came up with Power Set lugs which eliminate the need for tire chains, wheel weights, anti-freeze solutions and the like. The lugs are continually on the tractor wheel where, by setting one small lever, they are instantly in working position, and by the same method, are retracted just as quickly to inactive position where they remain out of the way for hard-surface, off-highway travel. The lugs operate independently of each other on their respective wheels. Either wheel can run on pavment while the other is off in soft material where the lugs can be extended for full traction.

They require no grease and have no constantly mov-

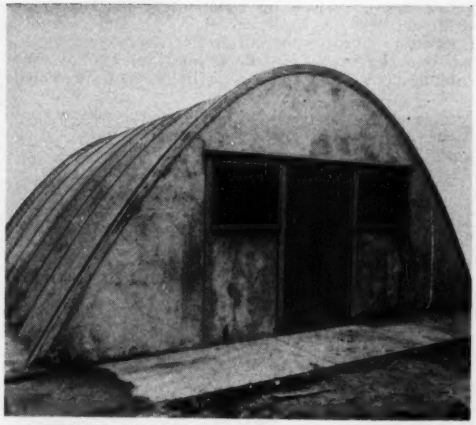
ing parts. When set for either in- or out-position, the mechanism becomes an integral part of the drive-wheel and rotates with it. The in-out lever needs no continued application of power to hold lugs in working position. Lever and brake are applied just long enough to cause arms to go out or in where they will stay until changed again. Construction is such that they will penetrate the ground and not cause a tractor to ride up on them, causing jolting and uncomfortable operating conditions. In the case of a punctured tire, the tractor can be driven to a repair shop on the steel rim.—**Retractable Power-Set Lug Co., P. O. Box 983, Kilgore, Tex.**



HARDBOARD FACINGS ON PLYWOOD FORMS Here's a shot of the underside of one of the many bridges on the New Jersey Turnpike. The unique factor is the use of a new concrete form panel called Plyron. Facings are of hardboard (made of compressed wood fibers) on a plywood backbone. Contractors here and on a building job in Los Angeles report 11 re-uses, exceptionally smooth surfaces, hard and smooth edges after several pours and easy handling. Hardboard bond is same moisture-resistant glues used in Plyform. Ten companies are combined in its manufacture, grouped under **Douglas Fir Plywood Assn., Tacoma, Wash.**



ROAD PATCHES ANY TIME WITHOUT HEAT Here's a road-patching material which may be applied in any kind of weather, can be stockpiled in usable form throughout the winter and laid down without heating, using standard road-repair equipment. The picture above shows a graphic comparision of Komac with another road material near it, photographed after several months of travel. (The circle represents a quarter.) Test roads in several states indicated that the special mix of bituminous binders and other aggregates will outlast other available premixes.—**Koppers Co., Inc., Pittsburgh 19, Pa.**



HUT-TYPE STRUCTURE FOR TEMPORARY CONSTRUCTION

Low-cost, non-critical materials, usually obtainable locally, are used in a new type temporary structure with many possible applications. Known as Patscafco Huts, these new structures, because of their parabolic contour, are not unlike Quonset huts in appearance, but there the coincidence ends.

Concrete structures of this type are designed to satisfy requirements for temporary housing and equipment shelters. They are fireproof, vermin resistant and unaffected by the weather. The only items that must be shipped from a manufacturing source are the removable rib forms, form fabric and wire mesh. Rolling tubular scaffolds are generally obtainable locally.

A 24x48-ft standard Patscafco hut calls for 14 cu yd of sand, 5 cu yd of gravel and 100 bags of cement. Other essentials are 85 fbm of nailing strips, 2300 sq ft of form fabric (bituminous paper) in rolls 3 ft wide. Seventeen sections of removable, re-usable rib forms complete the material-equipment list.

The arch shell consists of 1½ in. of cement plaster

(Continued on page 110)

DO IT ELECTRICALLY
with the NEW "111"

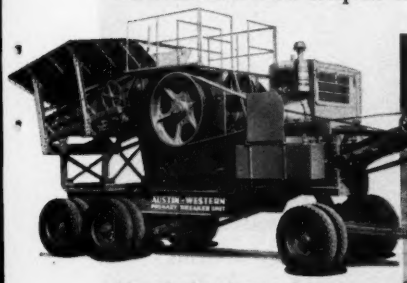
Production is higher
Upkeep is lower
Push Buttons do the work

Michigan Gravel

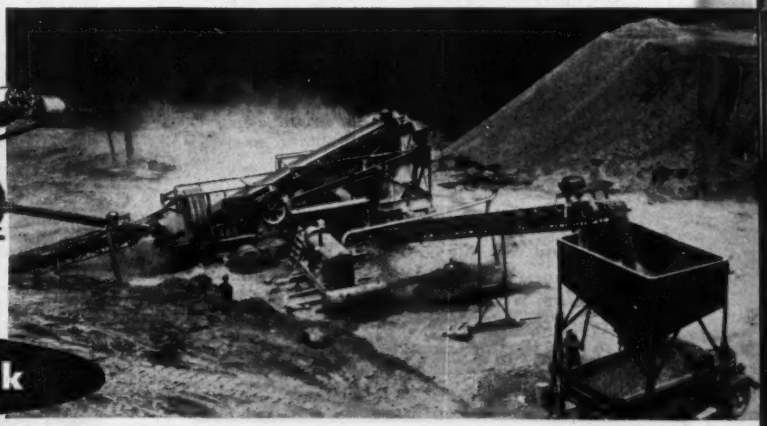
Production is higher—because each unit has its own electric motor drive; thus operates at top speed and efficiency at all times.

Upkeep is lower—because drives are simple and have few parts.

Push buttons do the work—the man on the platform starts and stops the feed and delivery conveyors, and has other units under complete control.



Primary Breaker units are made in several sizes; this one has a 3' x 10' apron feeder, 20" x 36" jaw crusher, power unit and delivery conveyor—all mounted on pneumatic tires.



Carolina Rock

The high production "111," with its 10" x 36" jaw and 40" x 24" roll crushers, is equally at home in gravel and rock. On this quarry job, production is still further increased by using a Primary Breaker unit with 32" x 40" jaw crusher (not visible in the photograph) to reduce the oversize to about 5 inches.

AUSTIN-WESTERN COMPANY · Subsidiary of Baldwin-Lima-Hamilton Corporation · AURORA, ILLINOIS, U.S.A.

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BALDWIN BLH LIMA-HAMILTON

SINCE 1859—BUILDERS OF CONSTRUCTION EQUIPMENT

Then... gasoline hit the hot manifold!

(Based on Hartford Claim #74651)

Last summer, while this diesel tractor was being used to clear pasture land, leaking gasoline from its starter tank hit the hot exhaust manifold. This caused a flash fire . . . intense enough to crack the fuel line and ignite the fuel oil.

The operator leaped free, suffering only slight burns, but was unable to stop the fire before it had caused $11,706.67 damage to the tractor.

Fortunately, the tractor was covered with Contractors' Equipment Insurance. Hartford paid the loss . . . permitting the owner to repair the tractor and resume operations.

• • •

Are *you* risking a big financial loss, a possible halt in operations should valuable equipment be damaged or destroyed? Protect yourself *now* . . . with a *Hartford Contractors' Equipment policy*. Write us for details or see your Hartford agent or insurance broker. In more than 5000 communities you can locate your Hartford agent by calling Western Union by number and asking for "Operator 25."

HARTFORD

HARTFORD FIRE INSURANCE COMPANY
HARTFORD ACCIDENT AND INDEMNITY COMPANY
HARTFORD LIVE STOCK INSURANCE COMPANY
Hartford 15, Connecticut

Year in and year out you'll do well with the Hartford

(Continued from page 108)

reinforced with wire mesh. This wire is attached to the waterproof bituminous paper which acts as a form and later provides added protection against insects and vermin. During erection, the paper is supported on removable steel pipe supports, spaced on 3-ft centers. The paper is stretched over wood nailing-strips, in turn bolted to the pipe supports. When the cement plaster is added in two coats, the paper sags approximately 2½ in. between the supporting forms, resulting in a stronger parabolic surface.

The end bulkheads are made up of 2x3-in. studs on the outside of which the bituminous paper, wire mesh and 1 in. of cement plaster are applied. The entire hut rests on a concrete foundation. Floor material is optional. Huts can be constructed to any length by repeated use of the removable rib forms.—**Patent Scaffolding Co., 38-21 12th St., Long Island City 1, N. Y.**

LEAKS SEALED SPEEDILY — A stabilizing ingredient has been added to Flextite that speeds up action in sealing off leaks and water seepage in concrete walls, according to the manufacturer. The new Flextite provides quicker action and more thorough bonding. A liquid chemical to be mixed with cement or cement and sand. Flextite produces a mortar which is said to be easily handled, fast-setting, and capable of sealing off severe leaks even against hydrostatic pressure. The material is recommended further for plaster-coated walls above or below ground or water level, as well as for pointing up spalled areas, for converting wet factory basements and similar applications. — **Flexrock Co., Filbert and Cuthbert, W. of 36th St., Philadelphia 4, Pa.**

The first real pipe that is plastic!

For long range economy plus ease of handling and installation, specify CARLON plastic pipe. This remarkable new piping medium brings the inherent advantages of plastics to the field of fluid, vapor and gas transmission. *Guaranteed* against rot, rust and electrolytic corrosion, it has a trouble-free service life many times longer than ordinary pipe.

CARLON pipe has been field-tested and proved superior for drinking water systems, sludge removal, drainage and irrigation systems, ventilating and cooling lines, hydraulic sluicing, and intake and exhaust piping.

Furnished in long, easy-to-handle lengths, CARLON requires a minimum number of fittings, and it can be installed rapidly without special tools or materials handling equipment. A complete line of standard I.P.T. plastic fittings is available for joining lengths of CARLON or for connecting this new pipe to previously installed metallic systems.

At present, raw material shortages are limiting the production of certain types of CARLON pipe. Every effort is being made to overcome this problem and to meet the need for CARLON . . . **the first real pipe that is plastic.**

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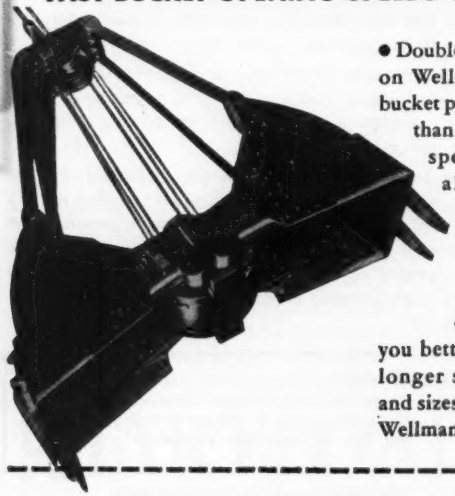
WELLMAN *Williams Type*

FAST BUCKET OPENING SPEEDS OPERATIONS



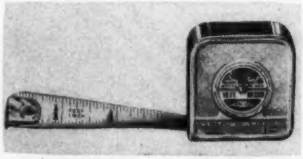
● Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

Want Facts?
Write for free descriptive bulletins.
CLAMSHELL • DRAGLINE • CUSTOM-BUILT BUCKETS • STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

PORTABLE SIGNAL FLASHER — Utilizing a set of three standard 90-v batteries in series, this lightweight portable electronic signal flasher assures longer battery life and greater long-range visibility, since it has no moving parts or filaments to burn out. Of cold cathode tube design, it emits a sharp brilliant flash of light clearly visible for approximately a mile under normal conditions. It can be carried by the handle, as shown in the photograph above, for use wherever signaling is required. An off-on switch, as well as an outside knob to control the number of flashes per minute, is provided. The tube is protected by a clear or colored precision Fresnel lens. Its aluminum case measures 6½x10 in., and weighs only 8½ lb.—**Haledy Electronics Co., 57 William St., New York 5, N. Y.**



STEEL TAPE RULE—Here is a wide, rigid, 10-ft tape which the manufacturer says can be extended to its entire length and held directly overhead without the blade buckling in the middle. Known as the Big Chief, the ¾-in. face is white with black markings. The bottom edge is graduated in inches from 1 to 120 and the top edge is calibrated in feet, permitting the conversion of inches to feet at a glance. Damaged blades are replaceable at approximately half the price of the original and swing tip allows the tip to rotate to one side, permitting accurate inside, butt-end and depth measurements.—**Carlson & Sullivan, Inc., Monrovia, Calif.**

ROCK RATED

TO GIVE YOU MORE YEARS OF PROFIT

P&H MAGNETORQUE* ELECTRIC SWING

SAVES YOU TIME, TROUBLE, MONEY!

Bring on your heaviest going! The 955-A is ready for it! It's the 2½ yd. companion of the famous P&H 1055 — with all its proved engineering — tough all-welded construction — greater stability — live roller circle — adjustable hook rollers — and many other advancements that assure years of hard service with minimum cost.

Operating advantages? More than you've ever known in a machine of its size. Magnetorque Swing does away with the old swing frictions — with all their headaches — forever. It's faster — 15% to 25% faster.

Ask us where you can see one in operation. Learn what "ROCK RATED" really means.

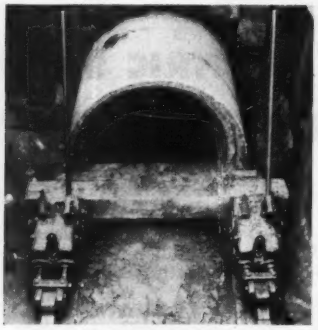
*T. M. of Harnischfeger Corporation for electro-magnetic type clutch.

P&H **EXCAVATORS**
4494 West National Avenue
Milwaukee 14, Wisconsin
HARNISCHFEGER CORPORATION

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

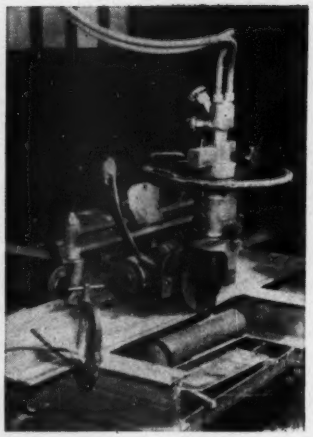
SAVE HOURS, CUT COSTS ON YOUR PIPING JOBS

PUSH PIPE UNDER STREETS, TRACKS, walks, floors and other obstacles with a GREENLEE Hydraulic Pipe Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, back-filling, tamping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes—model shown above for pushing ¾ to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump also available for extra ease and speed of operation.



GREENLEE

Write today for descriptive literature. Greenlee Tool Co., 2192 Columbia Avenue, Rockford, Illinois, U.S.A.

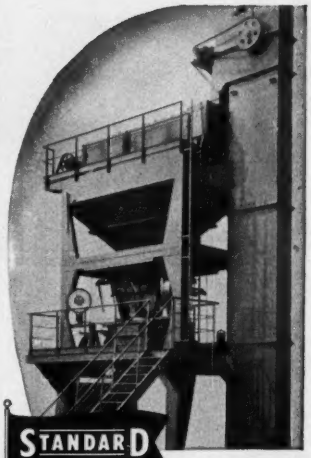


SHIELDS FOR STUDS AND ANCHOR BOLTS—Any contractor who has installed studs or anchor bolts only to find later that their threads have been mutilated or scored will be pleased to hear that heavy steel stud shields are available for protecting them. Four cuts are made in steel pipe while it is clamped in a jig (above). The cut sections are then heated, shaped and welded, and the shield interior partially threaded. With their installation the fear of damaged and stripped threads disappears.—**E. T. Hazeldine Machine Co., Terre Haute, Ind.**

RUSTPROOFING FOR PRECISION PARTS—Rubbing and sliding surfaces of precision parts such as thrust washers, pump pistons, gears, valve roller pins, stems and guides can now get two-fold protection with a chemical treatment known as Rustshield 2. It's a phosphating compound which changes steel and iron surfaces to rustproof, highly-absorbent, non-metallic areas. Close tolerances are unaffected, and the vastly increased surface area of a Rustshielded surface is an ideal base for the retention of lubricating oils. Retentive qualities are due to the hills and valleys formed during the process. Finishes of this type are said to be preferred to oxide coatings where resistance to abrasion is desired, as well as resistance to alkali cleaning, corrosion and heat.—**Octagon Process Inc., 15 Bank St., Staten Island 1, N. Y.**

You'll need equipment...
Equipment needs steel...
Steel needs scrap...

So turn in your scrap ere you end up with nothing but scrap equipment.



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MONEY-SAVING PAVING PLANTS

The most rugged plants in America and the cheapest to own and operate. Less maintenance. Simplest design. Seven sizes. Unit built. Prompt delivery.

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STANDARD STEEL CORPORATION
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WORLD'S FOREMOST "SHAKE-DOWN ARTIST"

The one-man Vibro-Plus Roll-gear Internal Vibrator will help you roll back rising labor costs and do a better job.

Available in electric, gas-engine or pneumatic-driven models delivering from 11,000 to 15,000 V.P.M. Exclusive patented features assure years of trouble-free operation.

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Packs a payload dirt cheap!

Boss truck of tough hauling jobs is International.

This has been true for 19 straight years. One reason is—Internationals pack bigger payloads for less money.

You can prove it just by counting the number of Internationals used by people in your business. Their records show International Trucks cost less to own and operate.

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Because International Trucks are available in 115 basic models, thousands of variations—you don't have to buy more truck than you need. And you never get less truck than you need.

What about the driver?

A driver takes better care of a truck he likes. He likes the new Internationals. He likes the Comfo-Vision Cab—"the roomiest on the road." He enjoys new riding comfort, improved visibility, greater ease of handling. He enjoys so many features that make his job easier, it's no wonder he likes International Trucks.

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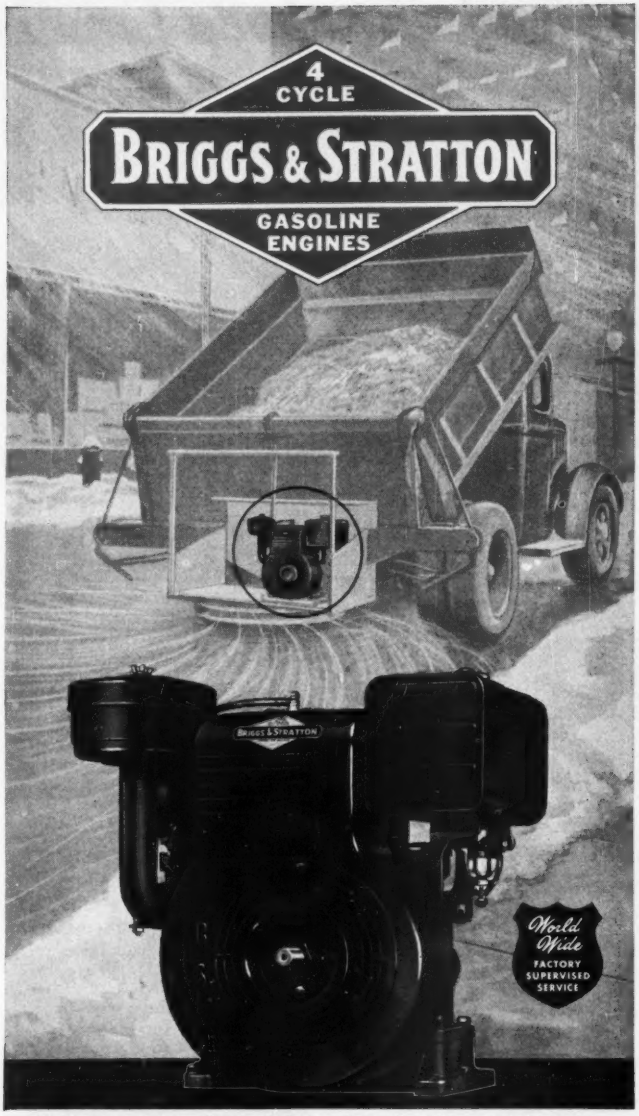
International Harvester Builds McCormick Farm Equipment and Farmall Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL TRUCKS

"Standard of the Highway"



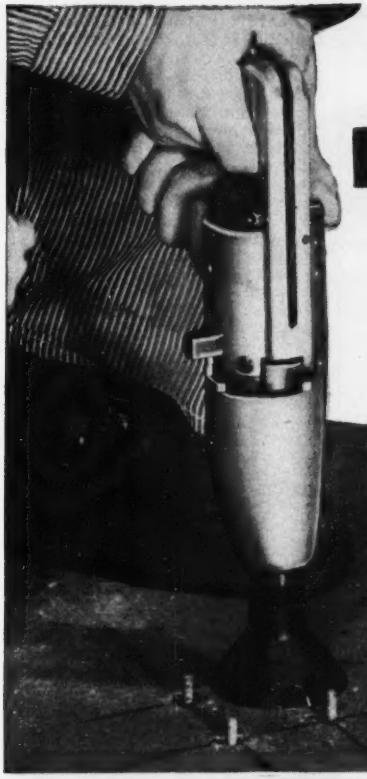
Preferred power for sand and material spreaders and a wide range of other equipment for road maintenance and construction — the world's most widely used single-cylinder gasoline engine on machines, tools, appliances used by industry, railroads, oil-fields, and on equipment for farm and home.

BRIGGS & STRATTON is the world's largest builder — more than 30 years of continuous production — of single-cylinder, 4-cycle, air-cooled gasoline engines. Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

ELASTIC GLAZING COMPOUND—The man intent on his work in the picture above is applying a new multi-purpose glazing compound which the manufacturer says is ideal for wood, steel or aluminum sash. Known as Penco Dual-Glaze, it's designed to be applied just like putty, but it develops a tough pliable skin. This remains elastic and permits normal expansion and contraction with temperature extreme, particularly in metal sash. The only restrictions by the manufacturer are that the sash must be absolutely clean and dry, and that the recommended number of clips or points must be used.—**W. S. McGuffie & Co., 3400 Theurer Court, Cleveland 9, Ohio.**

ELECTRODE OVEN—Moisture absorption by mineral-coated electrodes results in faulty welds and expensive rework costs, and further, tons of these electrodes are scrapped each year because it is safer to throw them away than risk using them. One solution to this problem is the Dry-Rod Electrode Oven. According to the manufacturer, this oven will control accurately the moisture to within .2%, the normal, accepted U. S. Government standard for moisture content. Basically it is a cylindrical, compartmented sheet metal unit which is heated by an 840-w element operating off 110- or 220-v circuits. It is insulated and a variable thermostat gives close control on temperatures up to 600 deg. Dimensions are 22 in. O.D., 25½ in. long, with a capacity of 350 lb of electrodes up to 18 in. in length.—**Philip Roden Co., 1721 E. Lake Bluff Blvd., Milwaukee 11, Wis.**



Fastens steel or wood to concrete or steel in seconds!

NEW CARTRIDGE-POWERED MODEL 450

REMINGTON STUD DRIVER

Sets fastening studs up to 100 times faster than conventional methods...needs no outside power source

You can speed construction and maintenance fastening jobs and cut costs with the amazing new Remington Stud Driver. This simple tool attaches steel or wood pieces and fittings to concrete or steel . . . easily sets as high as 5 fastening studs in a minute. No outside power source or other equipment needed. It's compact, rugged, *safe*. Test-proved to be the world's finest fastening system, the Model 450 Remington Stud Driver is made by Remington Arms Company, Inc., America's oldest and foremost sporting arms manufacturer. For detailed information and the name of your nearest distributor, fill out and mail the coupon below. There may be slight initial delays on delivery until production and distribution catch up with demand.

LOOK AT THESE EXCEPTIONAL FEATURES

COMPACT AND PORTABLE — Weighs only 5½ pounds, ideal for scaffold, ladder, overhead work, inaccessible places. Comfortable to use in any position.

SPEED—One man can set up to 5 studs per minute, as much as 100 times faster than other methods. Sets stud at whatever depth is required up to 2¾ inches, depending on material.

ELIMINATES INVESTMENT IN OUTSIDE POWER —Self-powered. Especially useful in isolated places.

TRIPLE SAFE—Plainly visible red dot indicator shows when it's cocked; safety must be depressed before and during squeezing of main trigger; permanently attached safety shield must be compressed against work before Stud Driver will operate. Trigger can't be accidentally tripped. Slight recoil. Low noise level.

WIDE VARIETY OF STUDS are available for every fastening job. Genuine Remington studs are trademarked for user's protection. Pull-out resistance as high as two tons in good concrete, depending on stud used. Cartridges are available in 5 power loads covering practically all fastening needs.

UNIQUE, FAST ASSEMBLY OF STUD AND CARTRIDGE—Tough plastic heel cap permits lightning assembly of any cartridge with any stud, identifies power load, protects head and thread of stud during driving.

PRICE for Model 450 Remington Stud Driver complete in rugged steel carrying case—only $119.50.

How to operate the Model 450 Remington Stud Driver

Hand-assemble stud and power cartridge, load as unit in easy-to-open Stud Driver, close.

Press loaded Stud Driver firmly against working surface, depress safety button, pull trigger.

Explosive charge imbeds stud solidly. Open Stud Driver with twist of the wrist, eject empty shell, load again. Whole job takes seconds!

Speeds all these jobs . . . and many more

1. Hanging steel sash and door bucks to concrete and brick.
2. Anchoring wood plates to concrete floors and ceilings for setting partitions.
3. Fastening wood furring strips to concrete for attachment of metal lath.
4. Anchoring suspended ceilings, sprinkler systems and lighting fixtures to concrete.
5. Attaching conduit and panel boxes to steel and masonry.
6. Anchoring light machinery to concrete pads.
7. Erection of signs, awnings and venetian blinds on steel or masonry.
8. Hanging radiator housings to concrete or brick.

"If It's Remington—It's Right!"

Remington DUPONT

MAIL THIS COUPON TODAY FOR FURTHER INFORMATION

Remington Arms Company, Inc.
Industrial Tool Division
933 Barnum Ave., Bridgeport 2, Connecticut

I am interested in obtaining detailed information on the Model 450 Remington Stud Driver.

Name _____

Firm _____

Position _____

Address _____

City _____ State _____

When you repower.... ....specify

FUNK
Heavy-Duty
CLUTCHES, TAKE-OFFS, and REDUCTION UNITS

FUNK Products include:

Straight Power Take-Off Clutches
Gear Reduction Take-Offs
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Ford Tractor Conversion Kit, changes to 6 or V-8 engine, doubles the power. Makes a Ford do things you wouldn't believe possible.

With machinery becoming scarcer and prices getting higher, operators everywhere are finding it an economy to repower their equipment with FUNK Clutches and Reduction Units. Before your next repower job investigate FUNK Units. They are available in a wide variety to fit almost any requirement for shaft speed and installation space. Fit any standard SAE flywheel housing or Ford Industrial Engine. Write for specifications and prices.

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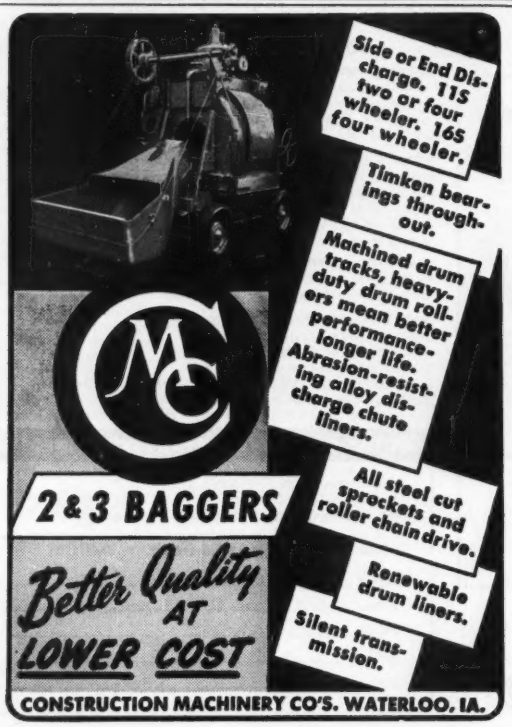
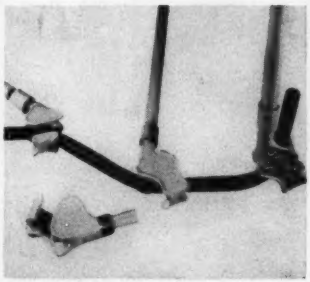

Side or End Discharge. 11S two or four wheeler. 16S four wheeler.
Timken bearings throughout.
Machined drum tracks, heavy-duty drum rollers mean better performance-longer life.
Abrasion-resisting alloy discharge chute liners.
All steel cut sprockets and roller chain drive.
Renewable drum liners.
Silent transmission.
2 & 3 BAGGERS
Better Quality AT LOWER COST
CONSTRUCTION MACHINERY CO'S. WATERLOO, IA.

NON-SLIP FLOOR COVERING—Called Fera-Mat, this material provides a firm walking surface composed of durable mineral granules resin-bonded to a heavy-duty weatherproof cloth backing. It's available in cleats measuring 6x24 in. or in 6-in. rolls, 86 ft long. Rolls are available only in black, but cleats are made in green and red as well. A protective underside liner is peeled off at the time of installation, exposing a pressure-sensitive adhesive. It's recommended for steps, ramps, platforms, factory floors, walkways, catwalks, fire escapes and the like.—**American Abrasive Metals Co., 460 Coit St., Irvington, N. J.**



SIX-WAY PIPE BENDER—The new TAL six-way Hickey, with its six no-slip bending jaws, is an ideal tool for making bends, elbows, sets, offsets, loops, saddles and stubs on open or slab work and in close quarters. The stub hole is a new feature devised for bending or straightening conduit protruding from concrete floors or walls. The long safety neck extends into the pipe handle to guard against accidents caused by the pipe handle breaking. The sure-grip jaws are another added safety feature against the hazard of the pipe slipping during bending operations.—**Tal Bender, Inc., Milwaukee 2, Wis.**

SUPER-FAST DRILL—Specially designed for plastic materials, the new drill was created by substituting a straight, round shaft for the spiral-grooved shaft found in conventional drills. This permits the drill to penetrate thick plastic sections easily whereas the spiral-shaped type must be fed slowly to prevent over-heating and withdrawn often for removal of chips and waste from the drill flutes. It has a round shaft which is only 40% of the actual drill dia. Another feature is a notched grind. By cutting two tiny notches in the drill tip, the chip is split into smaller sections which allows a less impeded chip flow and reduces friction. This, together with the air circulation caused by the rapidly revolving drill tip, keeps the drill cool and helps expel the chips, according to the manufacturer. — **Westinghouse Electric Corp., P. O. Box 1017, Pittsburgh 30, Pa.**

Progress is Continuous

1918 Perfection Body and Hoist

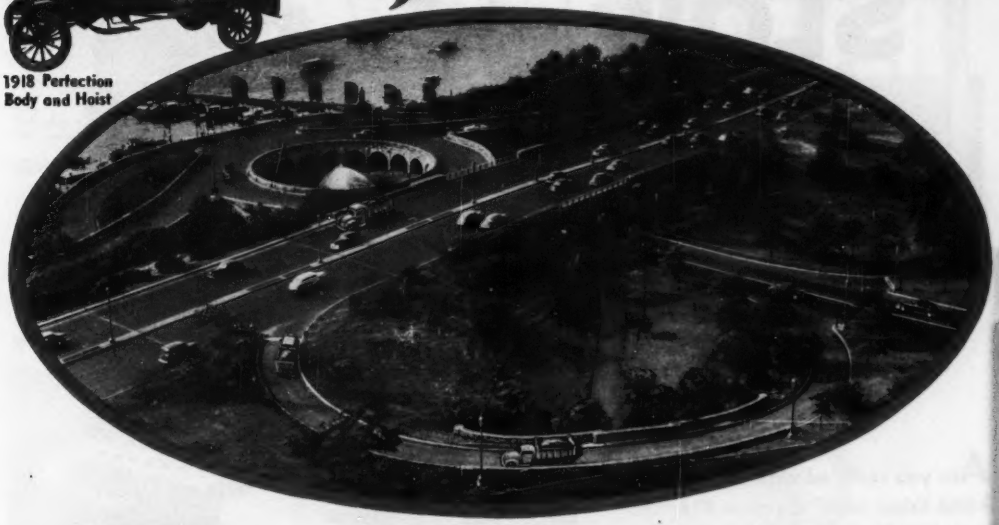


Photo shows a modern clover leaf intersection in New York State. Photo by Harold M. Lambert.

Photo shows a modern PERFECTION No. 354 Heavy-Duty Dump Body of 18 cu. yds. capacity (with sideboards) mounted with No. 1034 Iso-Draulic ROLL-A-LIFT.

"Progress" is continually making problems that yesterday's answers will not solve. Today's increased traffic requires a different approach than the simple right or left turn of yesterday.

Today's and tomorrow's haulage problems also demand truck bodies and hoists of much faster operating speed, more ruggedness and larger capacity.

Compare the two units pictured on this page — they contrast PERFECTION'S 33 years of continuously improved design. Thirty-three years ago PERFECTION'S good reputation was established on the outstanding service of those "little old" bodies and mechanical hoists.

PERFECTION TRUCK BODIES and HYDRAULIC HOISTS

maintain **their leadership today by their unexcelled performance, their up-to-the minute engineering and sturdy construction. Write for literature.**

PERFECTION
STAKE and DUMP BODIES
HYDRAULIC HOISTS

FOR ANY TRUCK
STANDARD or SPECIAL UNITS
IN ALL SIZES • FOR ANY USE

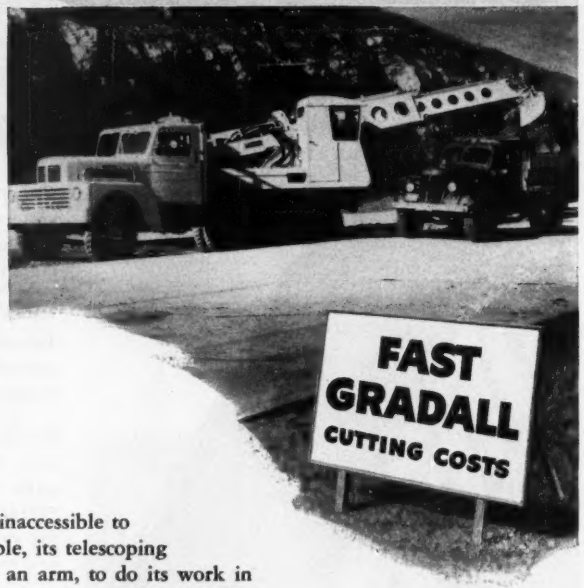
Engineered, Manufactured, and Guaranteed by
THE PERFECTION STEEL BODY COMPANY . . . . . Galion, Ohio, U. S. A.

Are you satisfied with your present hand labor costs? If you're like most construction men, your answer is probably an emphatic "NO"!

Hand labor *is* expensive—because it's *slow*.

But that's *not* the situation when you put a Gradall on the job!

The operator works with large tools, quickly changed for each particular job. He moves large quantities of earth rapidly, with such precision that clean-up hand labor is practically eliminated.



And the Gradall works in "tight" places inaccessible to other machines. Mounted on a 360° turntable, its telescoping boom "reaches out", twists and turns like an arm, to do its work in confining areas not much larger than the Gradall itself. And it's always "ready to go"—ready immediately to be driven to the next job at truck speed.

Cut your construction costs on many jobs, such as trenching, excavating, ditching, backfilling, grading, and pavement removal. Arrange a field demonstration with your Gradall Distributor today.

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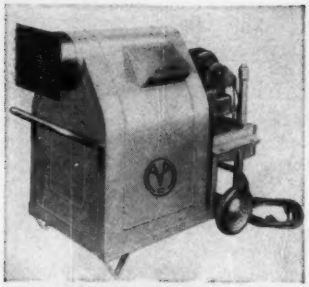
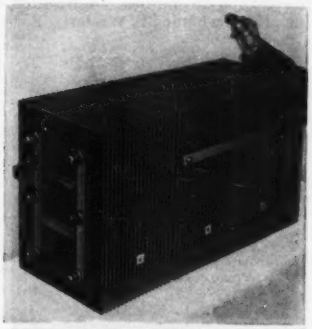
Gradall®
DIVISION OF WARNER & SWASEY Cleveland

GRADALL—THE MULTI-PURPOSE CONSTRUCTION MACHINE



SPACE HEATER — Model Master space heater has 200,000 Btu output per hr and is known as the Master Hot-R-Nell space heater. Said to require no warm-up period, the hot air output is about 10,000 and 12,000 cfm and the air is directed downward toward the floor by special louvers. The space heater burns kerosene or No. 1 or No. 2 fuel oil at the rate of about 1½ gph. Is recommended for general heating; thawing of material, equipment or working areas; also for space or hot water heating and for drying construction work. Mounted on rubber-tired wheels for quick portability, it weighs only 265 lb net and is provided with automatic shutoff. Thermostatic controls are extra. — **The Master Vibrator Co., Dayton, Ohio.**



SELENIUM RECTIFIERS — Now available are new custom-made ac to dc rectifier power conversion units of high current and voltage capacities. Selenium rectifiers are the accepted media for converting ac to dc, especially in applications where long life, instant operation at the flick of a switch, and complete freedom from maintenance are essential. The photo above shows the extremes of sizes. They are designed for and used with Syntron heavy tonnage vibratory feeders, grizzlies, bin vibrators, and electro - magnet hammers. Among other things, they may be used to supply dc power to arc welders, battery chargers, burglar alarms, dc motors, loudspeakers, hammers, vibrators, time clocks and elevator controls. — **Syntron Company, Homer City, Pa.**

You name the job....

CARVER has the PUMP

CP CARVER PUMPS

Carver Self-Priming Pump available in sizes from 4,000 to 240,000 GPH. Also Diaphragm Pumps up to 6,000 GPH. Ask for Bulletin No. 110 Carver Pump Co., 1402 Hershey Ave. Muscatine, Iowa.

Carver builds a complete line of Self-Priming Centrifugal Pumps from 4,000 to 240,000 G. P. H. They have the reserve power and stamina for outstanding dependable performance throughout long life on all kinds of construction work.

Put these Carver Pumps on any job you have. You'll be amazed at their lightning fast automatic prime, high suction lift, capacity to handle more water, faster, farther, easier.

No matter how tough the assignment Carver Pumps do the job thoroughly because they're designed right. Order the Carver Pumps you need *today* — they're your best buy for better performance.

CARVER PUMPS Muscatine Iowa

THOROSEAL *Restored* this Filtration Plant

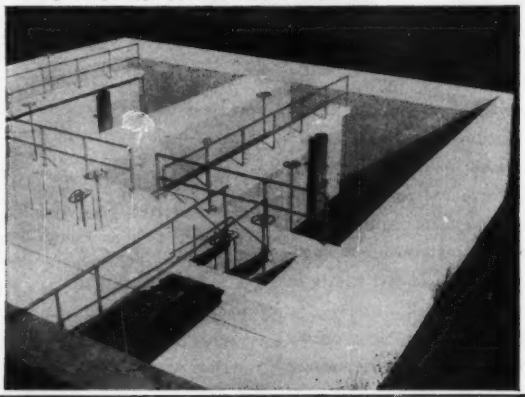
BEFORE

Example of complete break-down of masonry, due to penetration of water into body of concrete and action of frost in damp masonry.

It is amazing how THORO System products will correct a condition, such as shown in photograph. Concrete was sandblasted to remove all disintegrated material to sound concrete surface and reinforcing rods. Patching was done with THORITE Patching Mortar, bringing blistered areas to true and even lines, followed by two applications of WHITE THOROSEAL for protection.

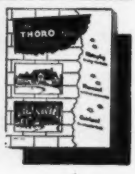
AFTER

At minimum cost, almost ⅓ the cost of other methods, concrete restoration, patching and surface protection was completed with THORO System products on Filtration Plant in Keyser, West Virginia. Contractor: Standard Construction & Waterproofing Company, of Cumberland, Maryland.



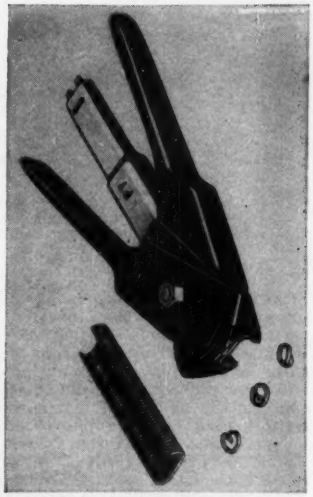
WATERPLUG	THOROSEAL	QUICKSEAL
To Stop Leaks	To Seal Surface	For Beautiful Finish

Our 20-page Brochure describes, in detail, how The THORO System products can benefit you in your construction plans. Send for brochure today, which shows methods of application and how to use the material.



Standard Dry Wall Products

Box X, NEW EAGLE, PENNA.



AUTOMATIC-FEED PLIER — Wire, rods, cords and cables up to ½-in. dia can pass easily through the opened staple which can be closed as small as 5/16 in. on this new hog-ring type stapler. Known as Model P7, the machine is just about the size of an ordinary pair of pliers, and fits easily into a mechanic's pocket. It uses staples which are pointed for easy penetration of fabrics. — **Bostitch, Inc., 499 Mechanic St., Westerly, R. I.**

SLUDGE PUMP—Fitted with a specially built electric motor for underwater operations, this submersible sludge pump was shown for the first time at this year's German Construction Fair at Hanover. It consists of a sludge-water centrifugal pump with directly-coupled underwater motor in a vertical position, as shown. The motor is said to be watertight and pit drainage is most complete, since the pump fits underneath the motor.

(Continued on page 124)

LORAIN MC-504W PACESETTER ON STEEL ERECTION

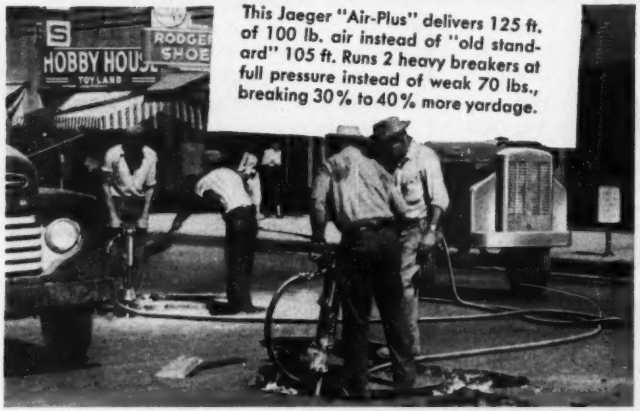
■ Here's steel erection at its best! Smooth . . . accurate . . . fast . . . maneuverable! And you get them all with a Lorain 25-ton Moto-Crane, Model MC-504W. *Smooth* — because of throttle control of load made possible by the hydraulic coupling power take-off. No jerks, no jolts, no slam-bang. *Accurate* — pin-point precision with infinite range of raising and lowering speeds. *Fast* — big, 220 H.P. carrier engine moves special Thew-designed, Thew-built carrier quickly to cover lots of territory, through 10 travel speeds up to 30 M.P.H. *Maneuverable* — with the power, tractive effort and rubber-tire "flotation" for covering the job from start to finish — unloading, distributing, erecting. Fully convertible from crane to dragline, clamshell, shovel, hoe.

THE THEW SHOVEL CO., LORAIN, OHIO

Three 25-ton Lorain Moto-Cranes, Model MC-504W, using 100 ft. booms, (maximum 130 ft.) work in unison to set precisely giant arches on the 1½ million dollar City of Providence, R. I. transit pier shed. Gilbane Building Corp. of Providence are the contractors — *and owners of 12 Lorains.*

THE W LORAIN

You Can Do 4 Days' Work in 3 with "New Standard" Jaeger Compressors



This Jaeger "Air-Plus" delivers 125 ft. of 100 lb. air instead of "old standard" 105 ft. Runs 2 heavy breakers at full pressure instead of weak 70 lbs., breaking 30% to 40% more yardage.

75 ft. 125 ft. 185 ft. 250 ft. 365 ft. 600 ft.

30% to 40% increases in production are yours with any "new standard" Jaeger from Model 75 that holds full pressure in a heavy pavement breaker up to Model 600 that runs 2 heavy wagon drills at full pressure with air to spare for hand-held drills. Jaeger Compressors deliver this 15% to 25% extra air at lowest cost per cubic foot of air of any compressor.

See your Jaeger distributor or write for Catalog JC-1.

THE JAEGER MACHINE COMPANY 800 Dublin Avenue Columbus 15, Ohio

PUMPS • MIXERS • HOISTS • TRUCK MIXERS • PAVING SPREADERS and FINISHERS

a SAFE Bet!

You're sure to win with these easy-wheeling Sterling barrows. Why? Because Sterlings are made to outlast any barrow on the market. Sterlings are engineered and built to take hard punishment, over a long period of years. That's why they cost less. Get the facts. Write for Catalog No. 61.

STERLING C5W

Maximum capacity 5 cu. ft. 16 gauge tray, all-welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.

Choice of wood handles or tubular steel frame . . . steel wheel or pneumatic tired wheel.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

(Continued from page 122)

The pump remains underwater all the time, eliminating need for a suction line. The type K-S 50 shown here can handle anywhere from 55 to 110 gpm with a variable head from 66 to 132 ft. The motor is rated at 4 hp, pipe connection at 2 in. and the weight of pump and motor together is 210 lb. The motor can be operated on 220 or 380 v; on request it can be supplied for every voltage up to 500. **—Emu, Unterwasserpumpen G.m.b. H., Hoff, Germany.**

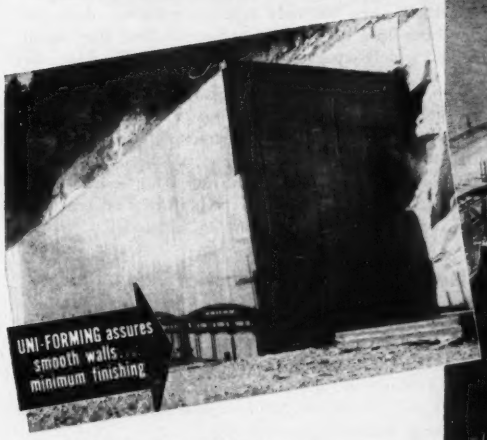
FIRE EXTINGUISHER—Chief characteristic of the REDI-GRIP pressurized portable fire extinguisher is its positive, one-hand operation. Inspected and approved by Underwriters Laboratories Inc., it's available in 1-, 2½- and 4-qt sizes with carbon tetrachloride, CBM (chlorobromomethane), individually or in combination. Expellent may be either air or carbon dioxide. Its range exceeds 30 ft and discharge time for the 1-qt size is about 27 sec at normal temperature. One of several made by—**Stop-Fire Inc., 125 Ashland Place, Brooklyn 1, N. Y.**

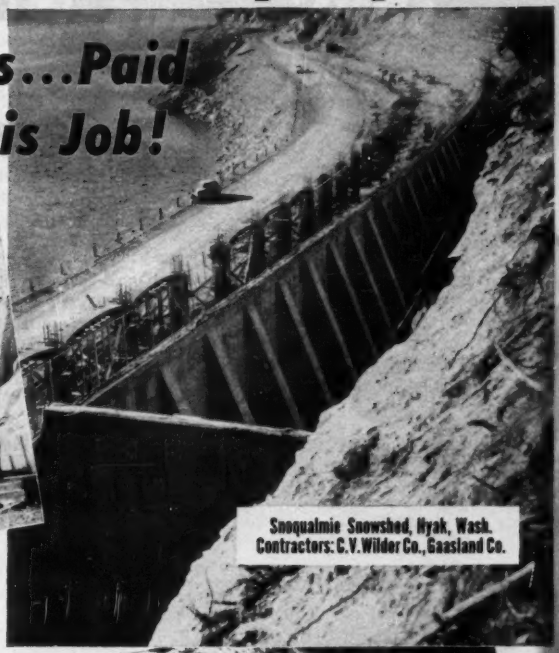
COOLING SYSTEM CLEANER — This cleaner inhibits rust and corrosion in the cooling system, softens coolant water to stop scale deposits, and filters rust, scale and foreign particles from the coolant.

Here's how the device functions: A controlled amount of water flows continuously from the cooling system and enters the cleaner. Water contacts the softening and inhibiting chemicals in a replaceable cartridge, and passes through a filtering medium where solids are removed. The filtered, softened water re-enters the cooling system and circulates throughout, with the result that coolant is free of particles, cannot cause scale deposits, rust or corrosion. The Fram radiator and water cleaner is said to be harmless to antifreeze and other cooling system compounds. **—Fram Corp., Providence, R. I.**

UNI·FORMS' Versatility...Speed..

Material Savings...Paid Dividends On This Job!





UNI-FORMS Form 95% of Concrete on Snoqualmie Snowsheds IN RECORD TIME

UNI-FORMS guaranteed great savings in time, material and labor on the Snoqualmie Snowshed projects in spite of complex forming requirements.

The retaining walls and counterforts, portals, pads, beams and columns involved countless variations and presented a seemingly difficult and costly forming problem.

Universal engineers, assigned to the project without cost to the contractors, demonstrated that standard UNI-FORMS would handle every forming requirement. The simplified assembly and easy handling of UNI-FORMS provided fast erection, pouring and stripping cycles to keep the job well ahead of schedule.

UNI-FORMS can bring the same savings of material, time and labor to your concrete forming problems. Why not investigate the advantages of UNI-FORMS today? Write for the UNI-FORM Catalog. There is no obligation.

Alignment and bracing required on 1 side only
One side erected... Reinforcing steel easily placed
NOTE THE CLEAN, SAFE WORKING AREA

BRANCH OFFICES and WAREHOUSES

BALTIMORE, MD. — HOUSTON, TEXAS
BOSTON, MASS. — SAN FRANCISCO, CAL.
CLEVELAND, OHIO — TAMPA, FLA.
DALLAS, TEXAS

... COMPLETE SERVICE WHEREVER YOU BUILD!

UNIVERSAL FORM CLAMP CO.

CONCRETE FORM SPECIALISTS FOR 39 YEARS

General Offices and Factory... 1238 N. Kostner, Chicago 51

2 Tournapulls shuttle over highways handle 2 jobs,

Rubber tires and electric steer let Operator Doyle Turman bring his Tournapull close to trees . . . spread 6-yd. load in 15 to 30 seconds.

Young Brothers of Waco, Texas, take profitable advantage of their D Tournapulls' ability to drive at 28 m.p.h. speeds through traffic. They not only step up work schedules by roading their 2 rubber-tired "D's" from job-to-job, but they often economically handle 2 widely separated contracts at once. For example:

A few months ago, the 2 LeTourneau rigs started a 30,000-yd. channel relocation and landscaping assignment at Kilgore's Memorial Hospital. When it became apparent that dirtmoving here would be held up several days each week by concrete work, the Youngs subcontracted 85,000 yds. of land-leveling for the new Longview Disposal Plant, 14 miles away. The 2 Tournapulls kept both jobs on schedule by shuttling back and forth over State Hwy. 26, as needed.

Here is typical production:

Time study at Kilgore showed the "D" with E-9 Scraper was push-loaded with 6 pay yards of topsoil in 18 to 30 seconds. 5160' cycles averaged 4 minutes 8 seconds for 12 trips and an individual output of 72 pay yards per 50-minute hour. Complete cycle was averaged at 18 m.p.h., despite haul of about 1700 ft. uphill across a field and another 880 ft. through heavy highway traffic.

Similar performance was recorded on Young's other jobs. Prior to the Kilgore and Longview assignments, the 2 "D's" leveled 10,000 yds. for a parking lot and access road at Belton . . . built a farm-to-market road in Ellis County . . . graded road-ways and parking areas at Camp Hood. Both rubber-tired rigs wasted little time between jobs . . . for example, left Camp Hood at 4 p.m. one afternoon, drove 60 miles under their own power to Waco by 6:30 . . . left Waco at 4:30 the next morning, drove 154 miles over State Rt. 31 to Kilgore by 12:30 that noon . . . put in a 6-hour shift on their new job the same day.

"Best dirtmover made . . ."

"I honestly think this LeTourneau D Roadster is the best piece of dirtmoving equipment made," says B. W. Young, one of 3 brothers who own the business. "We have never needed anything except a few minor adjustments on either of our machines."

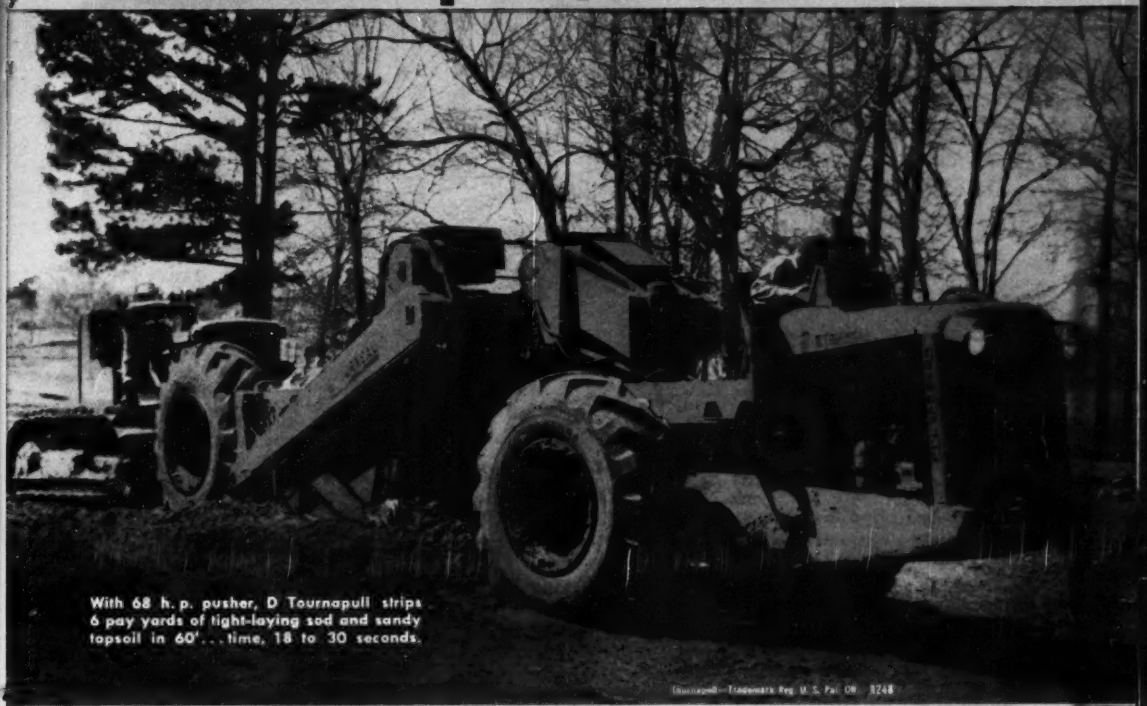
"The D Tournapull is the sweetest running rig I've ever operated," is the way Doyle Turman, one of Young's veteran operators, puts it . . . "it moves a lot of dirt fast and easily."

Ask your LeTourneau Distributor for all the facts about the money-making D Tournapull . . . how it builds profits in pusher-fleet operations on large jobs . . . how it cuts cost on one-man, self-loading assignments. Call him, or write for more information.

R. G. LeTourneau, Inc.

PEORIA, ILLINOIS

14 miles apart, at same time



With 68 h. p. pusher, D Tournapull strips 6 pay yards of tight-laying sod and sandy topsoil in 60'... time, 18 to 30 seconds.

(Tournapull—Trademark Reg. U. S. Pat. Off. 3248

Tournapull drives safely through traffic, over bridges, railroad tracks, around sharp turns.

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

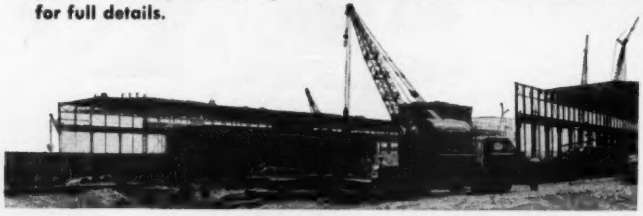
WORKS BOTH ENDS

ON BIG STEEL MILL PROJECT...

Get it done . . . and fast! That's the "word" at the site of U. S. Steel Company's new Fairless Works. And that's the reason James Armour Excavating Company is using two MICHIGAN Truck Cranes to handle and distribute materials at this huge steel mill project.

Here's just one example cited by operator Randall Auer: One of the MICHIGANS transferred pipe from a freight car to a truck, then followed the truck to a spot half-a-mile away where it unloaded the pipe. It then accompanied the empty truck back to the car for another load. The process was repeated until all the pipe had been removed from the car. Only MICHIGAN'S *speed and mobility* made it possible to work both ends of this job with one crane.

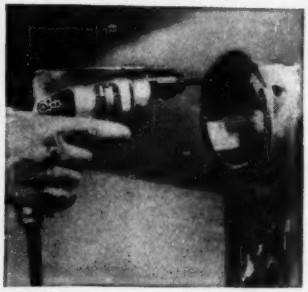
When you need an excavator-crane that has everything you want *plus* speed and mobility, investigate MICHIGAN . . . most complete line of ⅜-yard and ½-yard excavator-cranes available. Write for full details.



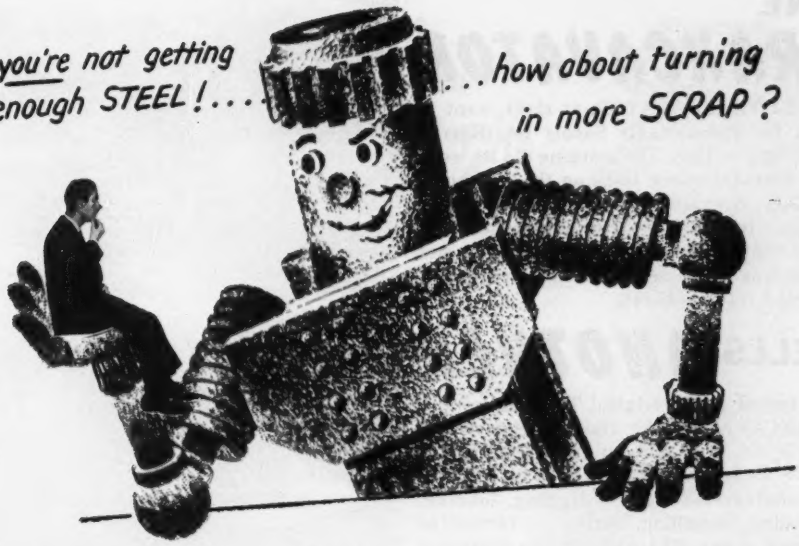
MICHIGAN POWER SHOVEL COMPANY

495 Second Street, Benton Harbor, Michigan, U.S.A.

GRADING WITH CARPENTER'S LEVEL — Found to be amazingly accurate for leveling, grading and simple surveying, the "Trans-A-Level" incorporates the use of an ordinary carpenter's level fitted with small metal clips for sighting. It can be placed on any handy platform; a carpenter's level is then placed on top, and the stub adjusting legs turned so that the "Trans-A-Level" is perfectly level. Spring clips are then slipped on the carpenter's level and the user sights along them as shown in the picture above, not unlike sighting a shotgun. It is compact and can be carried in a tool box.—**Argyle Mfg. Co., Colchester, Ill.**



NEW ¼-IN. DRILL — Among the outstanding features of this new model Holgun drill are full-sized ball bearings, heat-treated gears, splined gear shafts and smooth contour aluminum housings. The standard on this model is a no-load speed of 1,700 rpm with optionals of 2,500, 3,500 or 5,000 rpm. The low speed unit has a no-load rating of 600 rpm with optional at 1,000. Weighing only 3¼ lb, the drill is recommended for use in close corner drilling and for long hours of continuous operation. Available for 115- or 220-v power lines, its standard equipment includes 2-pole automatic-release trigger switch and locking pin, 3-wire cable and plug, 3-jaw, geared, threaded chuck and key.—**The Black & Decker Mfg. Co., Towson 4, Md.**



There's only one quick way to get more steel!

...get more SCRAP to the mills, at once

LET'S be realistic about the scrap shortage. The need for scrap is desperate. It threatens to hamper our whole National Defense effort—and it vitally concerns *you* because it boils down to this:

Unless 100,000 tons of industrial scrap roll into the steel mills every day, steel production will drop, and there'll be *less* steel for everyone—you included.

On the other hand, if more scrap is turned in, more steel will be turned out—and the more steel that's made the more steel *you'll* get.

So—if you want more steel—do your full share in getting your scrap back to the mills. Comb through your plant, again and again. Tap every source of dormant scrap. Dig out every retired machine that you can possibly spare and rush it to your scrap dealer. Rip out any old rails and switches that are rusting away on unused sidings—and scrap them. Scrap your antiquated dies, jigs and fixtures, your worn-out tanks and boilers that are gathering dust in some forgotten corner. Make sure that not a single pound of scrap is by-passed. Sell it—ship it. It means good money for you, more scrap for the Nation's scrap pile, and more steel for *everyone*.

• • •

Remember—the Nation's productive effort depends primarily on steel—and steel depends on SCRAP . . . *your* scrap. Turn it in—NOW.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

U·S·S CARILLOY STEELS

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

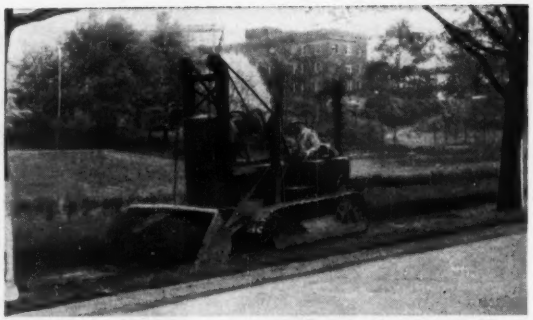
USS

1-1902

UNITED STATES STEEL

ONE TRAXCAVATOR®

The T4 TRAXCAVATOR, at right, went to work for Pennsylvania Supply Co., Harrisburg, Pa., in 1939. The machine did its work well, handling many tasks on the company's building contracts. Its performance — and profits — topped all expectations. For ten busy years the T4 took care of grading, loading and stockpiling. Increased business then required a second tractor-shovel.



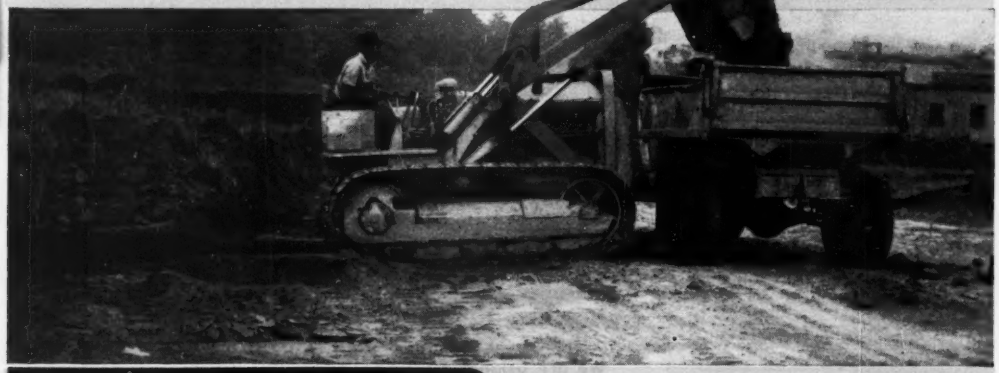
SELLS ANOTHER

The record of the original T4 made another TRAXCAVATOR the choice. Pennsylvania Supply Co. was sold on the TRAXCAVATOR'S ability to stand-up . . . to do all types of construction work — digging, loading, spreading, backfilling, 'dozing . . . to work at low cost. A new HT4, hydraulically-controlled TRAXCAVATOR was bought to assist the old T4.

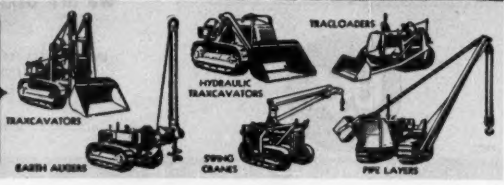
AND STILL ANOTHER!

The two TRAXCAVATORS handled tough jobs on highway and building projects — working in shale, clay, loam, shot rock, sand and other materials. A third TRAXCAVATOR soon joined the company's growing fleet.

You, too, will be sold on TRAXCAVATOR performance and profits. Ask your TRACKSON-"Caterpillar" Dealer to show you one at work . . . or write TRACKSON COMPANY, Dept. CM-121, Milwaukee 1, Wisconsin.



TRACKSON
TRACTOR EQUIPMENT



FLAT PLASTIC LAMINATE — A flat plastic laminate known as Alsynite Plasta-Glass is being produced on the West Coast. Usable for a wide variety of building purposes, its shatter-proof qualities are an important factor. The manufacturer claims that it eliminates glare by diffusing the light rays, thus helping to provide more light in areas usually dark. Tests are reported to indicate that Alsynite permits only about half as much heat transmission as glass. Easy to install, light weight, and capable of great load strength; a sq ft weighs about 8 oz. Panels are highly fire-resistant and will not crack, craze, warp, sag or rot. It is suited for sidelighting and skylighting in industrial and commercial buildings, according to the manufacturer.—**Alsynite Co. of America, 4670 De Soto St., San Diego, Calif.**

ENGINE WATER FILTER — Designed for installation in trucks, buses and automobiles for the prevention of damaging engine overheating, this Butler water filter can save motor oil, valves, pistons, rings and liners according to the maker. The centrifugal water-filter action of the filter removes particles of scale, dirt, rust and sludge that clog water channels in the heat exchanger, radiator and engine block. No screens, pads or chemicals are used. It is said to have a two-fold action: The rectifier section removes and prevents formation of mineral and rust scale. The filter section collects sludge in a glass collecting chamber where it is easily removed. The model shown above (C-40) is a centrifugal filter and water rectifier, rated at a gallonage capacity up to 40 gal.—**Butler Engineering Co., Inc., 2612 Rousseau St., New Orleans 13, La.**

You'll Save on Gasoline...Repairs ...and "Time Out"

Engineers say: *"Worn carbureters result in gasoline waste, expensive repairs and poor engine performance. On heavy duty equipment, carbureters should be completely rebuilt or replaced after 800 work hours."*

TAKE this tip from men who know—and make your replacements with Marvel-Schebler Carbureters.

Because of their rugged strength, unusual dependability and economy of operation, Marvel-Schebler Carbureters are original equipment on many industrial engines and tractors.

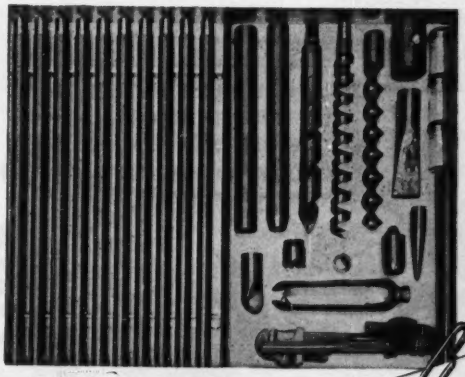
MARVEL-SCHEBLER PRODUCTS DIV.
Borg-Warner Corp., Decatur, Ill.

MARVEL-SCHEBLER
CARBURETERS

BW

Acker Soil Sampling Kit!

Everything you need for accurate sub-surface information



● PORTABLE
The Acker Kit is compact and light enough to be carried in your car.

● VERSATILE
12 different "all-purpose" earth and soil tools that will recover samples from practically any material.

● HANDY
All tools fit into a sturdy steel box, where they are always available for instant use.

● INEXPENSIVE
Nothing to get out of order—All tools are built to stand-up under the most rugged operating conditions.

Hundreds of these versatile testing kits are in use all over the world testing clay and kaolin pits, gold bearing sands, subgrades for highway and airfield runways, and many other subsurface strata.

Write today for prices and Bulletin 26CME

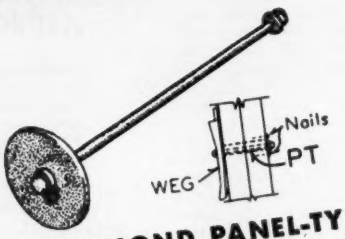
Over 30 years of experience in the manufacture and development of Drilling equipment.

ACKER DRILL COMPANY, INC.
SCRANTON 3, PA.

ENGINEERED TYING DEVICES, ANCHORAGES and ACCESSORIES for CONCRETE CONSTRUCTION

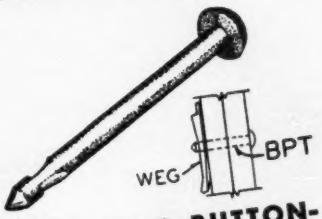
PANEL-TYS DO A REAL JOB OF END-STUD JOINING

And no wonder — as you can see for yourself, they're made expressly for quickly, securely tying together the end studs of adjacent panel forms. The regular Richmond Panel-ty has a head washer at each end and with a large loose fitting washer at one end. The Ty-holder engages at the other.

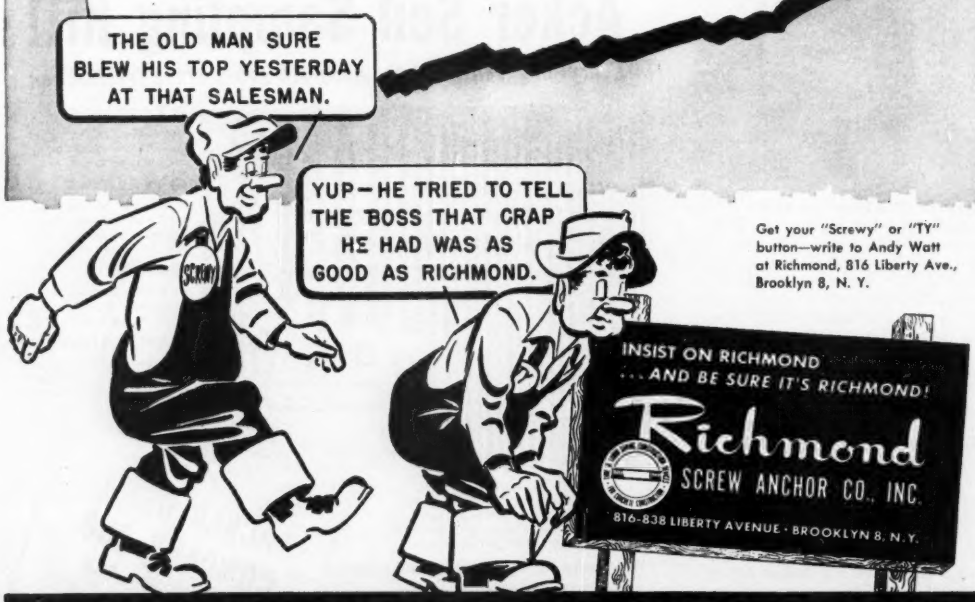


RICHMOND PANEL-TY

The Button Head Panel-ty is an aid to the most exact positioning. This design eliminates side slippage. The notched end is for the Ty holders.

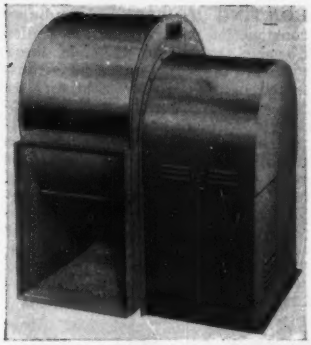


RICHMOND BUTTON-HEAD PANEL-TY


THE OLD MAN SURE BLEW HIS TOP YESTERDAY AT THAT SALESMAN.
YUP—HE TRIED TO TELL THE BOSS THAT CRAP HE HAD WAS AS GOOD AS RICHMOND.
INSIST ON RICHMOND
... AND BE SURE IT'S RICHMOND!
Richmond
SCREW ANCHOR CO., INC.
816-838 LIBERTY AVENUE · BROOKLYN 8, N.Y.

Get your "Screwy" or "TY" button—write to Andy Watt at Richmond, 816 Liberty Ave., Brooklyn 8, N. Y.

RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING



CENTRIFUGAL FAN—A new centrifugal fan arrangement with waterproof hood over the motor drive section can be installed outdoors without further protective enclosure, according to its manufacturer. Available with wheel diameters as large as 60 in., in backwardly inclined and forwardly curved, single width, single inlet models in Class I construction. Designed as Arrangement No. 10, the fan has all the high-efficiency, low-noise and low-hp characteristics of the rest of the Trane fan line, according to the company.—**The Trane Company, La Crosse, Wis.**

PLASTIC PIPE ON MINE BORES—On a recent installation at Wilkes-Barre, Pa., the Lehigh Valley Coal Co. installed 180 ft of 8-in. Carlon rigid pipe to transmit mine water from a pump to the surface at the rate of 800 gpm at 80 psi static head pressure. The installation was completed in 5 hr, using 21-ft sections of pipe connected by cemented slip-sleeve fittings. The all-plastic discharge sprout is shown above ejecting the water at a distance from the bore hole. Carlon is light in weight (⅛ as heavy as steel) and can be handled easily. It is said to resist the chemical action of sulphurous waters, alkalies, metallic salts, and other corrosive wastes frequently encountered in mining. Further, it acts to minimize frictional loss and will not accumulate scale.—**Carlon Products Corp., 10225 Meech Ave., Cleveland 5, Ohio**

DETACHED, LOADED & RE-ATTACHED

Ready to GO!

ROGERS

POWER LIFT

DETACHABLE GOOSENECK

TRAILER

PATENTS PENDING

Frame is lowered to ground without need of blocking. Maximum height of 16" assures rapid, safe loading of equipment.

Complete Literature available upon request—Any Rogers Dealer will demonstrate its features right on your desk, with an OPERATING SCALE MODEL.

DEVELOPED BY

The Trailer Pioneers

ROGERS BROS. CORP.

ALBION, PENNA.

220 ORCHARD STREET

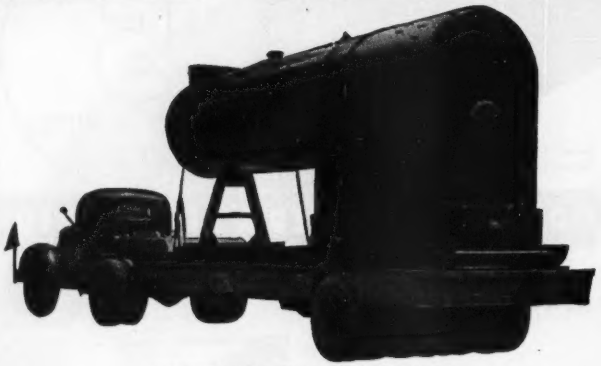
RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS

STOOPS TO CLEAR LOW OVERHEAD OBSTRUCTIONS

CARRIES HEAVIER LOADS MORE PROFITABLY ON LARGER TIRES

Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizeable savings for contractors.

NEED STEAM?



LUCEY 104 H.P. 150 and 250 lb. W.P.
Skid mounted with 24" oil burning base.

LUCEY Inside Seal-Weld
Double Calked **BOILERS**

1. 1040 sq. ft. heating surface.
2. 160 cu. ft. furnace volume.
3. Ample steam volume 54 cubic feet.
4. Oversize seamless firebox.
5. Butt straps calked and seal welded inside
6. Four-inch water space around firebox.
7. Boilers available from 40 to 150 H.P.
   Working Pressures from 125 to 350 lbs.

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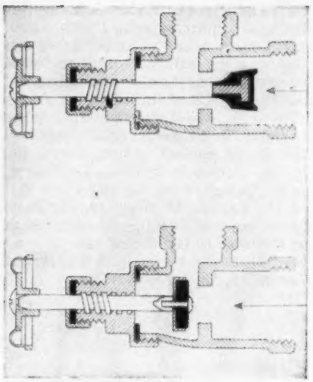
HOISTING TOWERS — Of tubular construction with welded assemblies of cages, bases and catheads, these units are described and clearly illustrated in a 4-p folder. Statistics on these welded assemblies and the company's "through bolt" system of section assembly show how they have managed to reduce the number of separate parts required for erection of the towers while increasing overall strength. Their heavy-duty type tower has a live load capacity of 5000 lb and a height limit of 1200 ft. The light-duty setup: 3200 lb and 201 ft respectively. Ask for Bulletin T-6. **—Beaver Art Metal Corp., Ellwood City, Pa.**



INNOVATION IN VALVE DESIGN —Essential operation of the new valve is based on working with, rather than against, the fluid flow. The cone-shaped seal is closed in the same direction as the movement of the liquid, allowing high or low pressure to seal the valve. The comparative picture above replaces the proverbial 1,000 words. The cup-shaped conical washer incorporates an imbedded metal plug which eliminates bending and warping, making the seal leak-proof. If contaminants in the fluid, such as sand or grit, are not pushed ahead of one sealing line contact, the conical shape of the seal provides establishment of a new line contact without damage to the bore. The rubber member of the seal is specially compounded to withstand oil, grease, steam, water, and most industrial chemicals. — **Rodic Chemical and Rubber Corp., Allen Ave., New Brunswick, N. J.**

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Equipment needs steel...
Steel needs scrap...

So turn in your scrap ere you end up with nothing but scrap equipment.

Look Into this Traylor TC Gyratory for efficient, large volume, primary crushing

NEARLY 11 FEET across the *non-weaving, straight line bar type spider* of this 60 inch Traylor TC! Six smaller sizes, down to 20 inch, are proportionately just as rugged . . . have feed openings of the same generous proportions.

YES, THAT'S THE FAMOUS, exclusive Traylor BELL HEAD and CURVED CONCAVES combination that nips larger rock . . . crushes it more uniformly . . . saves power, time and maintenance expense.

UPPER AND LOWER SHELLS are kept as simple as possible. Transportation and installation problems control the number of sections of each. The Traylor method of assembly assures single casting rigidity.

THE *one* crusher which brings *all* of the advantages of gyratory crushing to primary operations is the Traylor TC Gyratory. In it *alone* are found the Traylor *bell head* and *curved concaves* which have become the by-word of gyratory crushing performance and economy. Eccentric and counter shaft bearings are protected from excessive wear by the simple, effective Traylor dust seal and a water-cooled, forced-flow oil lubricating system. If you need a large volume primary crusher to satisfy rising production demands, it will pay you to investigate a Traylor TC Gyratory today.

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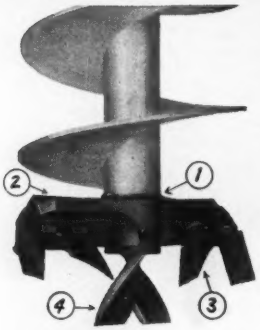

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2. Twin helix design eliminates back thrust; bores true, clean holes in any soil.

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Available in nine sizes, from 8" to 24" diameter.

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After clearing 500 acres of salt marsh for the Leslie Salt Company, J. O. Archibald, contractor of Redwood City, California said, "*LUBRIPLATE kept equipment rolling in mud, muck and water.*" You may never have an earth-moving job like this to do, but if you turn a wheel in any industry, you can profit by Mr. Archibald's experience.

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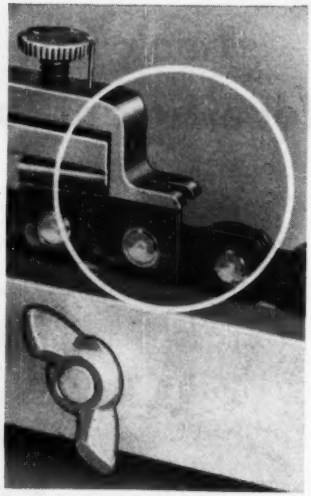

DEPTH-GAGE JOINER—A new tool called the Oregon Depth Gage Joiner is designed for determining and adjusting cutting clearances on power-saw chains having depth chains or riders. The manufacturer says it is set readily for any desired depth by turning a readable dial screw up or down and then placing it on the chain. All the chain riders may be filed to the exact uniform depth indicated by the gage. Riding prongs on the tool are hard-chromed to resist filing wear. — **Oregon Saw Chain Corp., 8816 S.E. 17th Ave., Portland, Ore.**

EARTH ANCHOR—The EZY earth anchor fills a long-felt need for a unique, speedy and easily installed tool for anchoring guy lines, making dead-man installations, and providing piling and piering for various types of construction work. Installations may be permanent or temporary and offer unusual resistance to tension and compression. Consists of a pointed steel body equipped with a wide-flange screw which pulls itself into and locks itself to the earth. About 15 turns are required for average installation, the operation taking approximately 3 to 5 min. They may be backed out quickly and re-used as needed. Soil is not displaced, but compacted tightly around the screw blade as the anchor descends. For extreme pulls, two or more units may be installed in line and tied together. In soft, boggy land or fill ground, barrel extensions permit desired depth of penetration. Reinforcing sleeves also may be telescoped over the anchor body to increase strength, as needed. Body sizes are 2x66 in. or 2½x54 in. Telescoping barrels are 3 to 5 in. in dia. by ½-in. steps. Lengths run from 35 to 31 in., respectively.—**Van Dyke Industries, 3625 Cahuenga Blvd., Los Angeles 28, Calif.**

New PUBLICATIONS From MANUFACTURERS

The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

VERTICAL SUMP PUMPS—Four basic units are made in a range of sizes from 1- to 10-in. discharge with capacities from 10 to 3,000 gpm and heads up to 140 ft. They are described in a handy, 8-pager, along with details, construction illustrations, selection tables and other helpful data.—**The Deming Co., Salem, Ohio.**

INDUCTION MOTORS — "Large squirrel-cage induction motors" is the title of a 4-p, two-color brochure put out by Allis-Chalmers Co. It explains end shields on induction motors which are designed to meet a growing demand for increased protection. Fully drip-proof construction plus all-around mechanical protection is standard on these models. Many mechanical modifications are available, such as double-shaft extensions or three-bearing construction. A large cutaway view explains in detail the various construction features. —**Allis-Chalmers Co., Milwaukee 1, Wis.**

AMERICAN REVOLVER CRANES —This new catalog features American revolver cranes in industrial use at ports and industrial plants throughout the world. It shows many specialized applications for these giants in industrial construction, and marine materials handling. Rated lifting capacities of the five standard models are listed, as well as short job stories from various sections of the world. Catalog No. 400-3 can be obtained from—**American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn.**

WELDING ALLOYS—A handy new chart of low temperature welding alloys, measuring 10x14 in., suitable for wall hanging or for purchasing department file, has been issued by Eutectic Corp. It contains detailed specifications on close to 200 metal-joining alloys including bonding temperatures, tensile strength, and recommended uses. Major listings show proper welding alloys for use with cast iron, steel, stainless steel, copper, brass, bronze, nickel, and nickel alloys. Further sub-division of the information covers use of the alloys with various heating methods.—**Eutectic Welding Alloys Corp., Dept. P, 172nd St. and Northern Blvd., Flushing, N. Y.**

JOYCE JACKS Chosen for Safety

BY E. W. LaPLANTE COMPANY

"We demand an exceptionally high factor of safety in all our moving operations . . . that's why we selected Joyce Speed Powered Air Jacks to move this 1,500 foot, 4,000 ton Savannah River Bridge 17 feet straight up! Sixteen Joyce Air Jacks controlled by five men, easily completed the project in two months with no injuries or damages. Traffic continued at all times."

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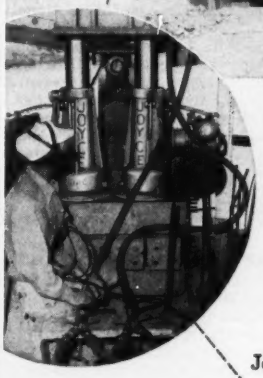

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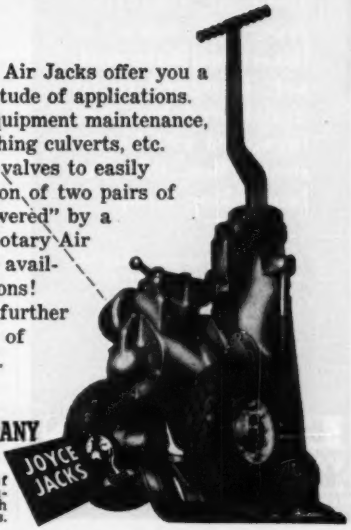
DAYTON, OHIO

Joyce builds a complete line of ratchet jacks, screw jacks, hydraulic jacks, shoring jacks, and trench braces—3 to 100 ton capacities.



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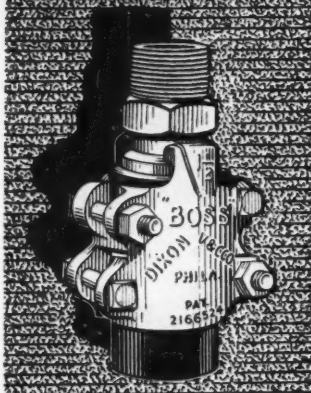

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SNOW FIGHTING INSTRUCTION BULLETIN—First anti-snow literature of the season is this 4-p folder which lists equipment requirements, plan of attack, and different methods of clearing for light, normal and deep snows. It also describes the advantages of fast plowing for dispersion and ten points of precaution before the snow flies. Pictures of the Water Snow Fighter are included, illustrating various blade combinations.—**Walter Motor Truck Co., 1001-19 Irving Ave., Ridgewood, Queens, L. I., N. Y.**

POWER BUGGIES AND SCREEDING MACHINES—These are the subjects of two 4-p folders from Whiteman. The first concerns the new FR-51 Power Buggy with a 44x60-in. flat bed and 2000-lb capacity. Several on-the-job photos are included. The other shows pictures and reproductions of letters from contractors who have been pleased with the performance of 44-8 and RS-5 portable screeding machines. —**Whiteman Manufacturing Co., 3249 Casitas Ave., Los Angeles 39, Calif.**

NICKEL AND HIGH NICKEL ALLOYS—This new technical booklet has been issued by the Development and Research Div. of International Nickel Co., Inc. Designated as Technical Bulletin T-33, it contains 32 pp, illustrated throughout with drawings and photographs. It also presents tables on mechanical properties, chemical compositions, recommended conditions for welding, and other information. Write to — **Technical Service Section, Development and Research Div., International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.**

SUPAIR THERMAL ENGINE—Bulletin 191 is a two-color, 12-p affair describing and illustrating the Nordberg Supair thermal engine, a 4-cycle diesel, Duafuel or spark-fired gas unit said to produce, in any given size, one-third more horsepower "than the conventional turbo-charged engine." Actual comparative test data contained in the bulletin show the advantages of this engine, principal of which are the engine's increased horsepower and thermal efficiency.—**Nordberg Manufacturing Co., Milwaukee 7, Wis.**

WEEKLY WALL CALENDAR—The Post 1952 calendar has 52 pp with an interesting weekly message on each page. There's also a coupon on each page which, when filled in and mailed, will bring you quotations and/or samples of drafting materials, as well as free good-will items such as handy decimal equivalent decals. Dates on this spirally-bound calendar are visible clear across the room and each page also carries a smaller full-month calendar.—**The Frederick Post Co., Dept. Z, PO Box 803, Chicago 90, Ill.**

THE BUSINESS OF HOME BUILDING

1. **Explains business methods that make home building more profitable.** Gives you "know-how" needed to make a profit with minimum risk to your money . . . a practical **understanding** of economic factors that determine the market for your product . . . the benefit of production knowledge based on the experience of other builders. **By Kenneth B. Johnstone, Carnegie Institute of Technology, and Charles Joern, Wm. Joern and Sons, 289 pages, $4.00**

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2. A practical book that shows you how to estimate construction costs quickly and accurately. Gives step-by-step instructions for estimating construction work of all kinds, including excavations, all parts of buildings, concrete, structural steel, and material transportation, profit, overhead, etc. **By H. E. Pulver, Prof. of Civil and Structural Engineering, U. of Wisconsin. Second edition, 653 pages, $7.00**

HANDBOOK OF RIGGING

3. **Condensed into this one book are all the tips, methods, and techniques essential to more effective rigging practices in industrial and construction operations.** Deals with everyday maintenance operations — with the transportation and handling of heavy machinery —with the erection and demolition of smaller size structures. **By W. Rossnagel, 321 pages, over 300 illus., $4.75**

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See your White Representative for facts about the *extra* dependability of White Trucks for your business.

LOADING—Rough going, but Whites can stand plenty of it. Check White frame design—built for shocks and strains with plenty of margin for safety.

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UNLOADING—The rugged White with 10 cu. yd. Easton Side Dump maneuvers into position with amazing time savings. Engineered for exact operating conditions, the Whites haul maximum yardage per load . . . maximum loads per hour.

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SAFE working loads of Upson-Walton tackle blocks exceed usual safe working loads by wide margins. (See table below.) They are engineered to withstand not only the weight of the load, but hoisting strength as well. In many cases a shackle is not required.

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COMPARE THESE SAFE WORKING LOADS!

	Usual Safe Working Load	Upson-Walton's Safe Working Load
3″ Single	200 lbs.	265 lbs.
3″ Double	300 lbs.	400 lbs.
3″ Triple	400 lbs.	540 lbs.
4″ Single	400 lbs.	510 lbs.
4″ Double	550 lbs.	730 lbs.
4″ Triple	700 lbs.	925 lbs.
5″ Single	500 lbs.	675 lbs.
5″ Double	750 lbs.	1000 lbs.
5″ Triple	1000 lbs.	1325 lbs.
6″ Single	1000 lbs.	1320 lbs.
6″ Double	1500 lbs.	1900 lbs.
6″ Triple	2000 lbs.	2640 lbs.
7″ Single	1500 lbs.	1700 lbs.
7″ Double	2000 lbs.	2575 lbs.
7″ Triple	2500 lbs.	3000 lbs.
8″ Single	1700 lbs.	2200 lbs.
8″ Double	2450 lbs.	2850 lbs.
8″ Triple	3200 lbs.	3500 lbs.
10″ Single	2600 lbs.	2750 lbs.
10″ Double	3400 lbs.	3650 lbs.
10″ Triple	4200 lbs.	4900 lbs.
12″ Single	3000 lbs.	3000 lbs.
12″ Double	3750 lbs.	4600 lbs.
12″ Triple	4500 lbs.	5400 lbs.

NOT THIS HOOK—*but* THIS HOOK

No Upson-Walton hoist hooks are formed by bending. All are drop-forged *to size and shape, with substantially heavier section at critical points.*

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BATTERIES—Battery AD-X2 is a white powder, packaged three envelopes per treatment package. Each envelope contains sufficient "Battery AD-X2" to treat one cell of a group 1 or 2 automotive-type lead acid battery. The 12-p catalog shows the company's simple economical way to combat battery sulfation. It introduces the personnel of the company, and explains their service system for batteries. Testimonials are included from master mechanics and equipment supervisors connected with various construction and engineering companies. — **Pioneers, Inc., 2411 Grove St., Oakland 12, Calif.**

COAL AND MATERIAL HANDLING EQUIPMENT — This is a 12-p illustrated bulletin describing a complete line of flight- and belt-type portable conveyors, as well as under-car unloaders for handling coal, coke, sand, gravel, and other bulk materials. Specifications are given on both electric and gasoline-powered models, and on hand-move and self-propelled conveyors. Copies are available upon request — **Lake Shore Engineering Co., Iron Mountain, Mich.**

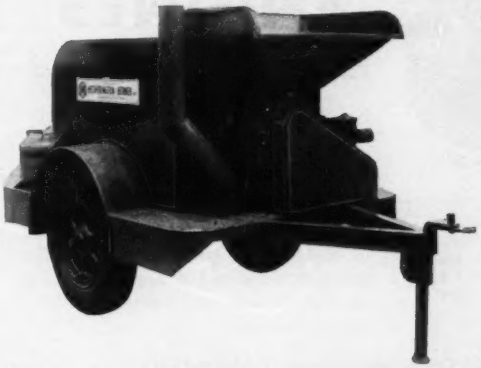
INCINERATORS—Plibrico is a recognized specialist in the incinerator field. This is its new 16-p catalog describing every type and size of incinerator made by the company to meet the requirements of practically any industrial plant or institution. Most unusual feature of the incinerators is monolithic refractory lining which is claimed to eliminate the weak joints of ordinary fire brick. Tables are included listing model numbers with their capacities per hr, over-all width, length, and height. —**Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.**

PROTECTIVE PAINTS—A 4-p technical folder containing a quick reference index to determine the most suitable coatings for rust prevention, chemical corrosion, and dampness is offered to architects, engineers, maintenance superintendents and painting contractors by—**The Wilbur & Williams Co., 130 Lincoln St., Boston 35, Mass.**

SPEED REDUCERS—This is a 96-p, pocket-size catalog which gives complete engineering data on how to select the proper speed reducer to fit requirements, including hp ratings, ratios, and installation graphs. The front section of the book includes a refresher on speed reducer selection, hp and torque, with several actual application examples. Cut-away photos show the inner workings on all makes and models.—**Abart Gear & Machine Co., 4834-36 W. 16th St., Chicago 50, Ill.**

Hetherington & Berner Announces

The Moto-Patcher



—a mobile mixing unit designed for easier, more economical road and street maintenance.

for speedy, low-cost patching

● The Moto-Patcher delivers up to 10 tons per hour of *freshly* mixed material. The aggregate may either be shoveled into the hopper, or fed into the hopper by a small elevator (optional equipment). The mixed material is deposited on a pan of convenient height for easy shoveling, or it can be dropped directly onto the road surface. The 400 gal. tank assures an adequate supply of bitumen for uninterrupted production, making frequent stops unnecessary. The mixer, running through the bitumen tank, provides a drying action for the aggregate. If desirable, bitumen may be circulated when machine is not mixing.

Bulletin MP-51, giving specifications, flow diagram and complete information, will be sent on request.

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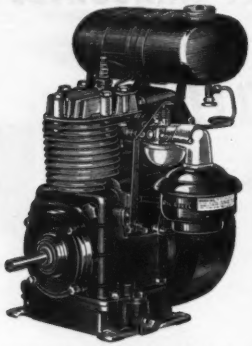

MODEL K-12-2, 3 H. P., 4-cycle, single cylinder, air-cooled. Length 14", width 14", height 19". Weight 43 lbs.

RELIABLE POWER FOR:
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- Strong, durable . . . pull or tension is distributed uniformly across joint.

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FLEXIBLE STEEL LACING CO. 4699 Lexington St., Chicago 44, Ill.

MINE HOISTS—A 24-p bulletin illustrates and describes various sizes and types of Nordberg Mine Hoists which are built in cylindrical, conical or cylindro-conical, single or double drum designs of the conventional or tandem type to meet any specific hoisting requirements. Bulletin No. 190 shows, with installation photographs, the application Nordberg hoists have in coal and ore mining operations, both in the U. S. and throughout the world. Each description of an installation contains pertinent engineering data on the hoists' operations.—**Nordberg Mfg. Co., Milwaukee 7, Wis.**

CORE-DRILL EQUIPMENT—All the various types and sizes of core-drill equipment in general use, for which standards have now been written in whole or in part, are included in a new Standards Bulletin No. 1 by the Diamond Core Drill Manufacturers Association. The publication clearly shows all parts, with cutaway drawings and nominal dimensions. These standards provide for interchangeability of equipment and components, and great care has been taken to leave the way open for individual ingenuity and invention in the future.

The bulletin represents collected knowledge, experience and thought of the 16 member companies of the Association, following the work of its technical committee. Work is being continued, and as further standards are approved from time to time, revisions of this bulletin will be issued.—**Diamond Core Drill Manufacturers Assn., 122 E. 42nd St., New York 17, N. Y.**

WELDERS' VEST POCKET GUIDE—A pocket-size booklet "Hobart Welding Electrodes and Welders' Vest Pocket Guide" contains useful arc-welding information. The handy booklet gives information on metals and electrodes, types of electrodes, four essentials of proper welding procedures, color marking for identification of electrodes, types of joints, typical positions, standard steel shapes, characteristics of the fillet weld, causes of common welding troubles, average electrode consumption, handy reference information, and information and instructions for using all Hobart Electrodes.—**The Hobart Bros. Co., Box EW-161S, Troy, Ohio.**

You'll need equipment...
Equipment needs steel...
Steel needs scrap...

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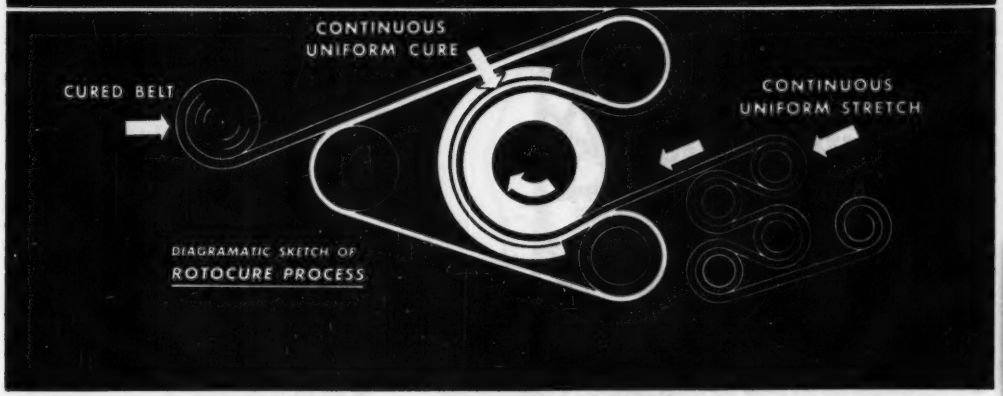
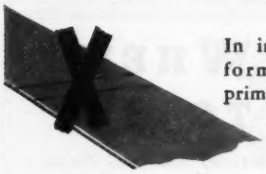


(No "Start and Stop" Curing--No OCS* with BWH ROTOCURED Belts)



In industry, attaining uniformity of product is a primary objective of those who buy and those who sell. *But you can't get it in conveyor belts made by conventional flat press methods!*

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In flat press curing, overcured segments due to press overlaps occur every 30 to 40 feet. These segments (2" to 4" wide across the entire belt) result because vulcanization is not continuous — sections cured earlier advance less than a full press length. The weakened structure due to overcuring invites operational weaknesses and is a major reason for early belt failure.

WHY ROTOCURE ELIMINATES THIS CAUSE OF FAILURE

As the accompanying diagram shows, BWH ROTOCURED CONVEYOR BELTS are made by a continuous, endless curing process. Weak segments due to overlapping can't *happen* because the belt is in constant, uniform motion.

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Inherent in the Rotocure process are these 4 specific advantages:

(1) Increased belt flex life — as much as 40%.
(2) Elimination of mechanical distortion at the press ends.
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(4) Uniform, abrasion-resistant covers.

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**It will pay you also to get the facts on BWH Rotocured Transmission Belts which permit operation at lower tensions.

*Overcured Sections — present every 30' to 40' in all belts made by the flat press method. Only Rotocuring (continuous, non-stop curing) eliminates this major cause of belt failure.

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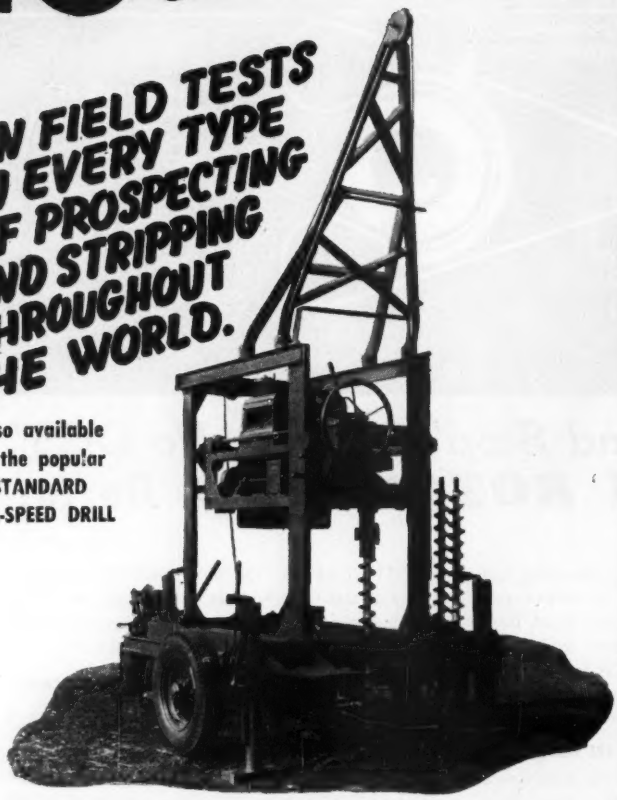

The Parmanco Two-Speed Transmission Drill is designed to meet the requirements of the general prospecting field where it is not necessary to drill in solid limestone. Special sliding frame permits drilling and pulling of augers without moving drill. New design of chuck eliminates all hand operation in raising power plant. Recommended for 50 to 60 feet with six inch equipment and can be used to greater depths with four and one-quarter inch equipment.

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TRACTOR ATTACHMENTS—Bulletin No. 895 describes hydraulic and cable-controlled earthmoving equipment manufactured to match Allis-Chalmers crawler-tractors. Included are the engine-mounted hydraulic control bulldozers, grade builders, and root rippers for the HD-5, HD-9, HD-15, and HD-20, and the three cable control units, HD-9, HD-15, and HD-20.

Specifications are listed showing at a glance the moldboard height and width, height of lift, depth of cut, degree of tilt, weight of blade and mounting, as well as over-all length of tractor and blade for every model. **—The Baker Manufacturing Co., Springfield, Ill.**

DEMPSTER DIGGSTERS—This is a 12-p booklet describing the front-end loader and excavating machines made by Dempster. Among the basic and important mechanical features of big shovels which have been engineered into Diggsters, are: simultaneous independent crowd end hoist, hydraulic crowding, hydraulic hoisting, variable crowd action at any dipper position, and interchangeable buckets. Each of these features is described at length and well illustrated throughout the book. Among the accessories available for this machine are a bulldozer blade, crane-boom extension, cab and winch.**—Dempster Bros., Inc., Knoxville 17, Tenn.**

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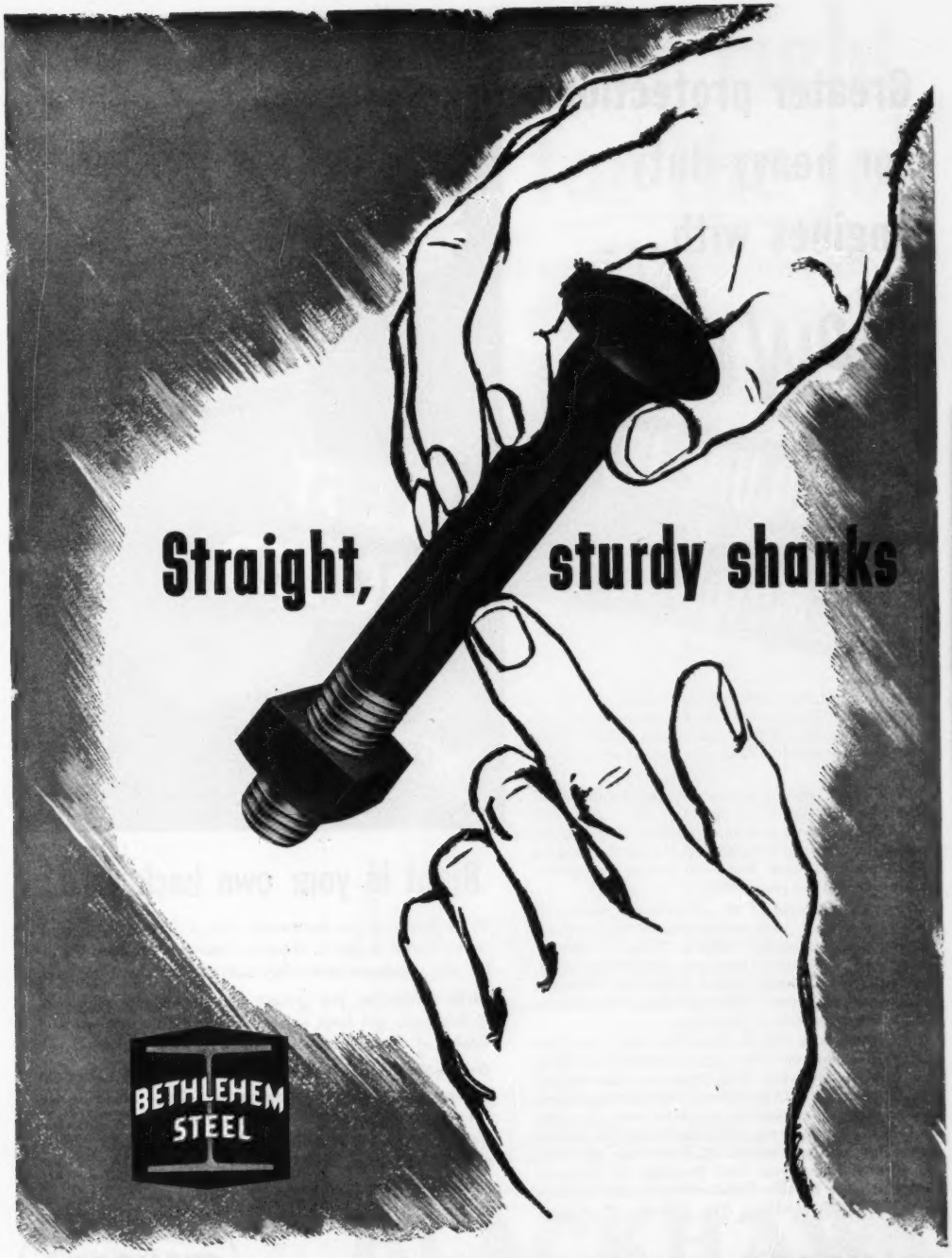

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Greater protection for heavy-duty engines with . . .

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Motor Oil

● Take a close look at the pistons shown in these unretouched photographs. They give graphic evidence of the superior protection new STANOLUBE HD-M Motor Oil offers in automotive diesel and heavy-duty gasoline engines.

The larger of the two pistons was taken from a diesel test engine after 480 hours operation (the Caterpillar No. 1-A Test) and shows clean, deposit-free ring grooves. The smaller was removed after test in a gasoline engine (the Chevrolet 36-hour Test) and reveals no varnish-like deposits on the piston skirt.

Here's graphic proof of two important properties of this new motor oil: improved detergent-dispersant action and greater oxidation stability. These two properties, proved by laboratory tests and confirmed in extensive field service, mean superior protection under the most severe conditions of high operating temperatures and prolonged periods of operation.

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Pick the right jack for the job

...from the world's most complete line of hydraulic equipment

TWO EXTRA-HIGH-LIFT BLACKHAWK JACKS (Model EA-27), yoked together to pull well casing, have top height of 49½", lift 20 tons each. *Don't do it the hard way — do it the HYDRAULIC way!*

HYDRAULIC JACKS ...up to 100 tons

GAUGE-EQUIPPED JACKS

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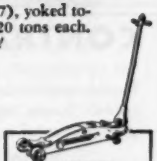

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HYDRAULIC KNOCK-OUT PUNCHES

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Save buying time when you need hydraulic equipment. Specify Blackhawk—and be sure you'll get the hydraulic tool that will match your requirements exactly.

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CONTRACTORS!

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120 GOOD USED BUSSES! 1936-37 Mack, 6CW, 25 Seat.

PRICES SLASHED FOR QUICK SALE! Fraction of original cost.

A terrific buy! All in good condition with many years of faithful service still in them. Eligible for certification by N.Y.S.P.S.C.—Extra discounts to lot buyers. Investigate this unusual offer.

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that other readers can use—
Advertise it in the
SEARCHLIGHT SECTION

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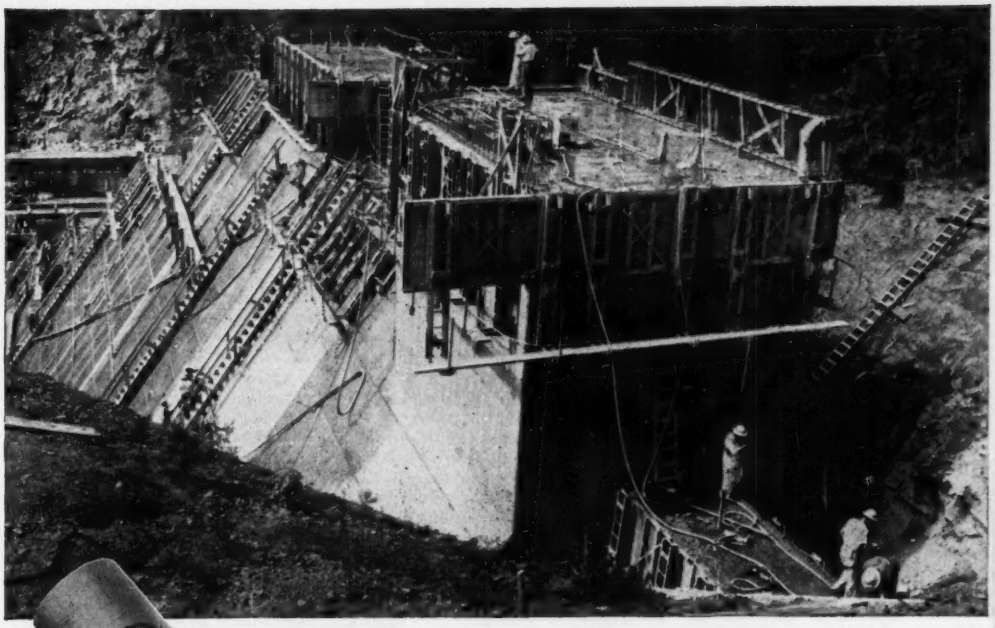


CHAMPION AIR DRILL HOSE

A super service hose of braided construction on oil-resistant tube, a strong flexible carcass and shock-resisting cover.

CHAMPION WATER HOSE

Top quality hose of wrapped construction, built with specially reinforced carcass, a smooth, friction-reducing tube and a rugged outer cover that provides maximum protection against external damages.

Philpott Dam finds solution to difficult Water and Air Hose problems

● Air and water hose, used in the Philpott Dam construction, came up against every enemy in the book. Changeable Virginia weather weakened hose resistance to high pressure loads, abrasive concrete structures clawed away hose covers, and the rocky terrain made deep, stabbing, carcass-penetrating wounds that caused sudden breakdown and work stoppage.

Ordinary hose wouldn't meet these challenges. Engineers, faced with rigid work schedules, couldn't put up with interruptions. They called in the local Republic Rubber Distributor, who, after a thorough study of all hose hazards, recommended use of Republic's Champion Air Hose and Republic's Champion Water Hose.

9,000 feet of these standard-built (not custom-made) pressure carriers went into immediate action for Philpott engineers who say Republic hose eliminated work stoppages and cut maintenance costs to absolute minimum.

Republic Rubber Products produce results like this for men in every industry. There's a complete line of Hose, Belting, Packing and Molded & Extruded Products. Just drop us a card regarding any one of these products.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

Methods Memo . . .

JET - POWERED CONSTRUCTION EQUIPMENT is on the horizon. Solar Aircraft Co., San Diego, Calif., has developed a portable gas turbine power plant that powers a Navy fire-fighting pump and a small electric generator for the Air Force. The engine develops 45 hp at 40,000 rpm, operates on diesel fuel and is started by two men turning a crank. Fire pump application weighs 165 lb complete except for fuel tank. Potential uses include pumping of fluids, blowing of gases, powering of tools and space heating.

WORTH WATCHING is a program sponsored by the State of California to promote greater safety consciousness among construction workers, along with increased knowledge and more effective use of safe work methods. The plan first is being tried out in southern California counties; if successful, it will be started in the rest of the state. Under the plan, organized by the state department of industrial relations, there will be a construction safety committee in each county, composed of representatives from all local building trades unions. The states will provide written recommendations at least once a month for the control of specific construction hazards and committee members will review and discuss these recommendations at regular meetings of their unions.

THE CRUSHED STONE INDUSTRY is discussing with the Office of Price Stabilization the advisability of a tailored ceiling price regulation for its products. Pricing currently is under the General Ceiling Price Regulation. It has been suggested that OPS issue a price regulation based on CPR 77, which establishes ceiling prices for agricultural liming materials. Most of the discussion on more realistic pricing of crushed stone products centers on rising transportation costs, since producers ship at a delivered price.

FOR 50 YEARS a granite rock as big as an automobile choked a roadway at the receiving door of the Puget Sound Power & Light Co. shop at its Snoqualmie, Wash., hydro-electric plant. The best that air hammers could do was chip off the corners. Recently, Elmer Putnam, master mechanic at the plant, accidentally cracked off the bottom of a chilled milk bottle by running hot water into it. He applied the lesson to the obstinate granite, first heating it with an acetylene torch and then cracking it with a sledge hammer. Layers of hot rock popped off the boulder just like the glass bottom of the bottle, with the result that tons of rock were chipped away in one day and the roadway was cleared.

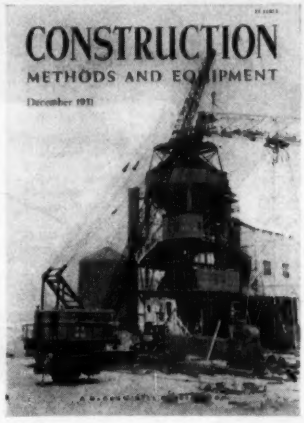
UNDERGROUND CORROSION of lead-sheathed electrical cable, steel piping and structural steel will be minimized at U. S. Steel's new Fairless Works at Morrisville, Pa. Bars of magnesium are buried adjacent to structures there and tied in electrically for cathodic protection. Careful measurements of soil and water samples from the site preceded design of the bars in the effort to keep corrosion losses by electrolysis at a low level.

FULLY 2,791,000 WORKERS were employed in August in all construction projects, according to W. F. Patterson, Director of the U. S. Labor Department's Bureau of Apprenticeship. He stresses the need for many more thousands of construction workers — especially in the ranks of skilled workers. Toward that end, the Bureau of Apprenticeship has expanded its service to include assistance in setting up "Skill Improvement" programs.

TRAINING SCHOOLS CONTINUE to be popular with operators and owners of construction equipment. A somewhat different slant is taken by the Thew Shovel Co. in one of its training schools which has distributors' service men for students. Classes consist of no more than four men who spend all their time in various Thew plants for the two weeks of the course. It is practical, "dirty clothes" training where the service man can ask questions at any time, get a demonstration of the problem under discussion and learn by doing.

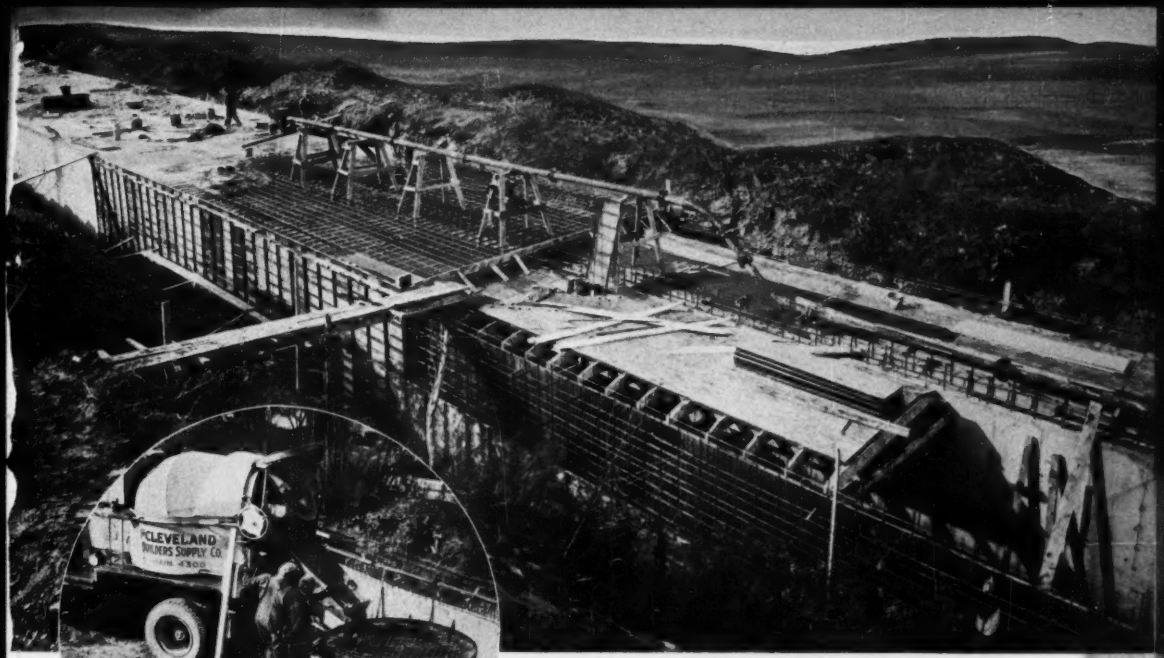
LOAD-BEARING BRICK OR TILE WALLS can be used to eliminate entirely the use of structural steel in buildings of three stories or less. So says C. Forrest Tefft, president of the Structural Clay Products Institute. He points out that sizeable savings of critical building materials are possible and that masonry piers can be used in many structures in place of steel columns. A bulletin is available showing how brick and structural tile can be utilized in many out-of-the-ordinary applications. For a free copy write to the Institute at 1520 18th St., N.W., Washington, D. C.

A BULLDOZER BLADE became a lethal instrument recently in a side-swiping accident in Arizona when it sliced through a truck carrying 23 Indians and fatally injured nine of them. The bulldozer was mounted on a crawler tractor being trucked over a highway at night. The blade extended beyond the side of the truckbed and cut through one side of the passenger-carrying truck as they passed each other crossing a bridge. Driver of the wrecked truck claims that the extending bulldozer blade carried no lights. Here again is shown the need for exercise of every caution while moving construction equipment over public roads.



On the Cover . . .

On Falcon Dam way down on the Rio Grande a P&H 1055 long-boom crane deftly tucks the top and final section of the main conveyor into place to serve the batching and mixing plant. The cement silo is at the left, cooling plant at the right. This Johnson batcher and three 2-yd Koehring mixers on the U. S. side of the river, are now spouting concrete for the spillway and both the American and Mexican power houses. Falcon Dam Constructors and Constructora Intercontinental, S. A., a joint combine under separate corporations, are contractors on this big international irrigation project. We told you all about the earthwork operations in CM&E, September 1951, page 48. Fellows, don't pay any attention to our lovely secretary, who remarked: "Of course this shot will make the front cover, the boss took it." We still think it's a swell picture of a swell job.



Big Creek Culvert, Cleveland, Ohio. Owner—City of Cleveland; Engrs.—City of Cleveland; Contr.—Galier Bros. Co., Cleveland, Ohio
Pozzolith Ready-Mixed Concrete furnished by
The Cleveland Builders Supply Co.

POZZOLITH

Pumped Concrete Here . . .

In addition to producing the easy placeability and good cohesiveness required for this pumped concrete job, Pozzolith, cement dispersion, provided these important results:

1. REDUCED PLACING COSTS
2. DESIGNED STRENGTH
3. LOW PERMEABILITY
4. GREAT DURABILITY

Investigate the advantages of Pozzolith for your next job . . . it will enable you to obtain the qualities required at *lower cost than by any other means.*

Over 600 Leading Ready-Mix Plants Are Producing Pozzolith Ready-Mixed Concrete

OTHER MASTER BUILDERS PRODUCTS IN WHICH CEMENT DISPERSION IS EMPLOYED

EMBECO . . .
For non-shrink grouting and re-integration.

MASTERPLATE . . .
Industry's long life floor. Non-colored and 11 colors.

MASTERTEX . . .
Cement-base paint of low permeability for protecting and decorating exterior and interior surfaces of concrete and masonry.

OMICRON MORTARPROOFING . .
For tight brick walls. Provides good workability with 15-20% less water. Contains stearate.

the MASTER BUILDERS Co.

CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO, ONTARIO

TIMKEN® bearings help new Gar Wood scraper make time on new turnpike

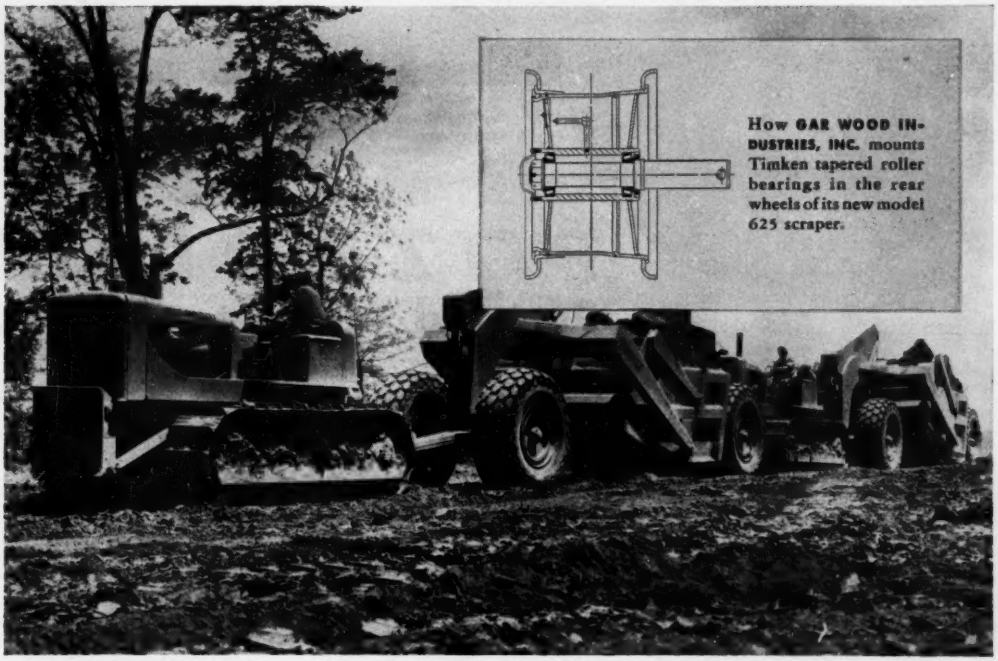
SHOWN here at work on the Western end of the Pennsylvania turnpike extension, these new model 625 Gar Wood scrapers are a big help in keeping the project moving along on schedule. Each one can dig, carry and dump a load of 25 cubic yards of dirt. Timken® tapered roller bearings in the wheels carry the heaviest loads, help keep the scrapers on the job with minimum time-out for maintenance and repairs. Pulling and pushing the scrapers are giant Allis-Chalmers torque converter tractors—each equipped with 50 Timken bearings in the tracks, final drives, bevel gear shafts plus other important applications.

Because of line contact between the rollers and races, Timken bearings have extra load-carrying capacity. The tapered construction of Timken bearings enables them to take both radial and thrust loads. Wheels and shafts are held in rigid alignment, reducing wear on moving parts.

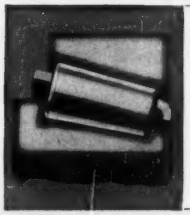
The incredibly smooth surface finish and true rolling motion of Timken bearings practically eliminate friction. And more effective closures are possible because Timken bearings keep housing and shaft concentric. Lubricant is kept in; dirt and grit kept out.

No other bearing gives you all the advantages you get with Timken tapered roller bearings. Make sure they're used in the construction equipment you buy; specify bearings with the trade-mark "Timken" for the equipment you build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **GAR WOOD INDUSTRIES, INC.** mounts Timken tapered roller bearings in the rear wheels of its new model 625 scraper.



GREATER LOAD AREA

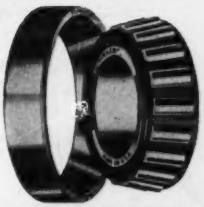
Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

CONSTRUCTION METHODS AND EQUIPMENT

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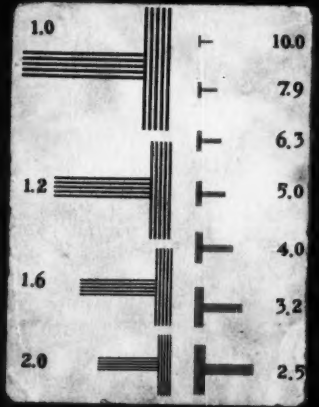
RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and 100/20 = 5.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and 7.9 x 5 = 39.5 lines per millimeter recorded satisfactorily. 10.0 x 5 = 50 lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.

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